Personality and Its Inside and Outside:

A Dyadic, Developmental Perspective

Thesis

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All higher psychological functions are internalized relationships of the social kind, and constitute the social structure of personality. Their composition, genetic structure, ways of functioning, in one word, all their nature – is social. Even when they have become psychological processes, their nature remains quasi-social. The human being who is alone retains the function of interactions.

(Vygotsky, 1960, p. 198)

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ABSTRACT

The present thesis examines individual and dyadic personality development with a particular focus on the context of intimate relationships. Furthermore, it investigates inside and outside perspectives on personality such as the self-, partner-, and meta-perception and their role for relationship satisfaction.

The introduction of the thesis centers on personality traits, their development across the life span and their interaction with the environment followed by methodological considerations. The introduction closes by an overview of the current work.

The main part of the thesis includes the four empirical studies that are now briefly summarized. Study 1 focuses on individual development of self-evaluative personality traits in the transition to early adolescence. In doing so, it investigates the role of gender, puberty, and school transition. Study 1 is based on longitudinal data of 205 adolescent children across three annual measurement occasions. The main results of Study 1 suggest that the transition to early adolescence is a critical period for self-development. Decreasing trajectories were found with respect to both global and domain-specific self-representations. Furthermore, inter-individual differences in the decreasing trajectories could be partly explained by gender (steeper decreases for girls) and school transition, whereas puberty was unrelated to developmental trajectories, but showed concurrent associations with self-representations.

Studies 2 and 3 are interested in the dyadic interplay between different perceptions of the Big Five personality traits (i.e., self-, partner-, and meta-perception) and relationship satisfaction. Whereas Study 2 focuses on the relatedness and distinction between the perceptions as well as their associations with relationship satisfaction, Study 3 examines associations between perception discrepancies and relationship satisfaction. The two studies are based on the same cross-sectional data consisting of 216 intimate couples. The findings of Studies 2 and 3 demonstrate that the self-, partner-, and meta-perceptions are related, but

distinct personality aspects. Furthermore, Study 2 shows that the three perspectives have similar, but also differential associations with relationship satisfaction. In addition, Study 3 indicates that not only personality level, but also the discrepancy between different perceptions is related to relationship satisfaction.

Study 4 investigates whether personality traits serve as both predictors and outcomes of relationship satisfaction as well as relationship climate while focusing on neuroticism and self-esteem. It includes longitudinal data across two measurement occasions over two years consisting of 141 intimate couples. The main findings of Study 4 indicate that neuroticism is a negative predictor for relationship satisfaction on the intra-personal level (i.e., actor effect), whereas self-esteem is a positive outcome of relationship satisfaction on the inter-personal level (i.e., partner effect). Furthermore, the results demonstrate that a positive relationship climate is predictive for high self-esteem two years later.

The discussion part of the thesis summarizes the main finding and gained knowledge based on the four empirical studies and discusses implications of the studies from an integrative perspective. Prior to the final conclusions, a first attempt to a theoretical model on personality development that involves the self-, other-, and meta-perception of personality is introduced called the "*Tri*ke Model of Personality Development".

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1. INTRODUCTION

Personality traits represent relatively enduring characteristics of the self that manifest in individuals' inner and outer world such as in their thinking, feeling, and perceiving, as well as in their acting, reacting, and interacting (John & Srivastava, 1999; McCrae & John, 1992). Thus, personality can be imagined as bridge carrying information from the individuals' inside into the surrounding environment and vice versa. In this vein, personality and its development should always be examined in contexts. An important context consists of social relationships that are interconnected with the human being's fundamental needs to be attached, to belong, and to be valued by others (Bowlby, 1973; Cooley, 1902; Baumeister & Leary, 1995). Specific forms of social relationships are of particular relevance in different developmental phases across the life span. Whereas the relationship to parents is of high significance from the first day of life and during childhood, peer relationships become more and more important during adolescence and often evolve as the central point of reference for adolescents. In addition, intimate relationships represent the closest and deepest kind of relationships during adult life span. Therefore, the context of intimate relationships is of high relevance for studying the interaction between personality and environment as well as adult personality development.

The present thesis focuses on personality development in individuals and in the context of intimate relationships. Furthermore, it examines different personality perspectives on intimate partners and their role for relationship satisfaction. The first part of the introduction centers on global and self-evaluative personality traits. Moreover, the self-, other-, and meta-perception of personality traits are described. The second part of the introduction summarizes knowledge about personality development across the life span followed by a brief discussion of important developmental contexts. To bring the two aspects together, theoretical approaches with respect to interactions between personality and environment are introduced.

The third part includes methodological considerations. The introduction closes by presenting three open research questions that are linked to the current work comprising the four empirical studies.

1.1. Personality Traits

Stable differences in emotions, cognitions, and behaviors that distinguish individuals from one another across diverse situations, contexts, and time can be explained by individuals' personalities (Costa & McCrae, 1992; Digman, 1990; McCrae & John, 1992). The "power of personality" has been documented by means of empirical findings demonstrating the predictive value of personality traits for physical and mental health (Ozer & Benet-Martínez, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007; Trzesniewski, Donnellan, Moffitt, Robins, Poulton, & Caspi, 2006). Two main categories of personality traits refer to global and self-evaluative personality traits.

The Big Five Traits

The Big Five traits represent the five most prominent global personality traits and are known as neuroticism, extraversion, openness, agreeableness, and conscientiousness (Costa & McCrae, 1992; John & Srivastava, 1999). Briefly, neurotic individuals are prone to experience more negative affect such as worry, sadness, or anxiety, and tend to have less positive interactions in comparison to emotionally stable individuals (Hampson, 2012; Widiger, 2009). In turn, extraverted individuals have high levels of positive affect and are known to be social and joyful in interactions with others (Fleeson, Malanos, & Achille, 2002; Lucas & Diener, 2001). Individuals high in openness can be described through their affinity for aesthetics and novel ideas, their intellectual curiosity, and their general desire to expand experiences in life (e.g., McCrae & Sutin, 2009). Agreeable individuals tend to maintain positive relationships with others and engage in social behaviors that facilitate intimacy (Branje, van Lieshout, & van Aken, 2005; Jensen-Campbell & Graziano, 2001).

Conscientious individuals are known to have the ability for controlling their impulses and to be task- and goal-directed (John & Srivastava, 1999). Precursors of the Big Five traits are already observable in early childhood referring to corresponding temperament dimensions (McAdams & Olson, 2010).

Global Self-Esteem and Domain-Specific Self-Concepts

Global self-esteem and domain-specific self-concepts belong to the family of self-evaluative personality traits. Global self-esteem is defined as the individual's feelings and appraisal of oneself as a person (Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995). Individuals high on global self-esteem generally evaluate themselves in a favorable light and can be described through their "average positive tone of self-feeling" (cf. James, 1890; Leary & Baumeister, 2000). Domain-specific self-concepts are closely linked to the construct of global self-esteem and refer to the individuals' beliefs about themselves and their value in a particular domain such as academics or appearance (Bosson & Swann, 2009; Harter, 2006a). In contrast to the Big Five traits, realistic evaluations of global self-esteem and domain-specific self-concepts develop around middle childhood as a result of increased cognitive abilities (Harter, 2012).

1.1.1. Self-, Other-, and Meta-Perception

The most common method to measure personality traits corresponds to individuals' self-perceptions by means of self-report. Self-perceptions comprise the intra-psychic representation of the self which has been described to reflect the individual's identity (Hogan & Roberts, 2004; Roberts & Wood, 2006). However, as personality traits manifest in the individuals' environment, they are also observable from an outside perspective. Thus, the assessment of other-perceptions by means of other-report represents a further method for capturing personality traits. Frequently, other-perceptions are conceptualized as reputations (cf. Back et al., 2011; Hogan & Roberts, 2004). It has been shown that individuals have

certain knowledge about how others perceive them. Or in other words, they have an idea about their reputation in the social environment. This perspective on personality is known as the meta-perception covering individuals' representations of and beliefs about how the own personality is perceived by others (Carlson & Kenny, 2012; Laing, Phillipson, & Lee, 1966).

Previous research has been interested in the question whether different personality perceptions provide identical or distinct information about an individual (e.g., Back & Vazire, 2012). Thus, does the self-perception of a person collapse with the other-perception of a friend? Or, is an individual's meta-perception congruent with the intimate partner's other-perception? Overall, it has been reported that the self-, other-, and meta-perceptions are related, albeit distinct implying that the perspectives contain shared as well as unique personality aspects (Carlson, Vazire, & Furr, 2011; Kenny, 1994; Kenny & DePaulo, 1993; Vazire & Carlson, 2010). Another line of research focuses on the question whether discrepancies between personality perceptions (i.e., self- and other-perception) are related to individuals' well-being such as relationship satisfaction in the context of intimate relationships (e.g., Rusbult, Finkel, & Kumashiro, 2009; Swann, Rentfrow, & Guinn, 2002).

1.2. Personality and Its Development in Individuals and Contexts

It has been shown that despite their relative stability, personality traits are prone to change across the life span (Allemand, Zimprich, & Hertzog, 2007; Allemand, Zimprich, & Martin, 2008; Roberts & DelVecchio, 2000; Trzesniewski, Donnellan, & Robins, 2003; Twenge & Campbell, 2001). The following paragraphes focus on personality development from an individual, environmental, and transactional (i.e., individual x environment) perspective.

1.2.1. Personality Development in Individuals

How do personality traits develop across the life span and why do some individuals remain stable whereas other change with respect to personality traits? Amongst others, there

are three indicators in order to describe stability and change (cf. Asendorpf, 2005; Lang & Heckhausen, 2005). First, the rank-order stability defines the stability of the relative ordering of individuals on a specific criterion (e.g., personality traits). A high rank-order stability of neuroticism would for instance indicate that individuals hold their position as being low, average, or high in neuroticism in relation to other individuals across a certain time. Second, the mean-level change determines whether a criterion of a group of individuals on average increases or decreases, or remains stable across time. For example, the circumstance that individuals become on average more agreeable when they get older would appear in a substantial positive mean-level change (e.g., Roberts, Walton, & Viechtbauer, 2006). Third, the concept of inter-individual differences in intra-individual change points to the phenomenon that individuals systematically differ from each other with respect to how a criterion such as personality traits develops. Hence, it might be that some children increase in their global self-esteem during the transition to adolescence whereas other children follow a decreasing trajectory.

Various studies provided evidence that the rank-order stability of the Big Five traits and global self-esteem become increasingly stable from childhood to adulthood (Roberts & DelVecchio, 2000; Trzesniewski et al., 2003). In terms of mean-level change across the life span, findings demonstrated systematic changes with respect to particularly three of the Big Five traits. It was found that neuroticism decreases whereas agreeableness and conscientiousness gradually increase as a function of age, a developmental pattern that has been described as the maturity principle (Caspi, Roberts, & Shiner, 2005; Roberts et al., 2006; Srivastava, John, Gosling, & Potter, 2003). With respect to the mean-level trajectory of global self-esteem, it was reported that global self-esteem is relatively high in childhood, decreases during early adolescence and increases in later adolescence and throughout adulthood (e.g., Twenge & Campbell, 2001; Robins, Trzesniewski, Tracy, Gosling, & Potter,

2002). Furthermore, evidence for inter-individual differences in intra-individual change has been reported for the Big Five traits as well as for global self-esteem (e.g., Allemand et al., 2007; Wagner, Gerstorf, Hoppmann, Luszcz, 2013; Wagner, Lüdtke, Jonkmann, & Trautwein, 2013).

Life Transitions

One important topic with respect to personality development refers to transitions, thus, phases in life that include social and biological transformations from one developmental state that is familiar to the individual into another new or unpredictable state. The nature of transitions can be normative and expected or unrelated with age and sudden (cf. Caspi & Moffitt, 1993). However, all occurrences of transitions have in common that they are associated with novelty, ambiguity, and uncertainty (Lazarus & Folkman, 1984). The latter might promote a restructuring of the self and, in turn, lead to personality development (cf. Caspi & Moffitt, 1993). One drastic transition in life corresponds to the transition from childhood to adolescence characterized by various changes on very different levels such as biological, cognitive, and social levels (Donnellan, Trzesniewski, & Robins, 2006). Therefore, the transition to adolescence might represent a particular interesting life period to study personality development.

1.2.2. Personality Development in Contexts

Individuals are embedded in relationships, social networks, cultural settings, and historical periods, thus, all factors that compose a complex system corresponding to the conception of "environment" (cf. Bronfenbrenner, 1979). As individuals are permanently influenced by systematic factors of the environment, the investigation of their developments should always consider environmental contexts. The current thesis particularly focuses on the environmental context of social relationships.

Social Relationships across the Life Span

The metaphore of the safe haven is often used to describe a secure attachment of a child to its attachment figure(s) mostly represented by mother and father (Fraley & Shaver, 2000). The convoy model of Kahn and Antonucci (1980) adapted the metaphore into the context of further important relationships across the life span which is coherent with Bowlby's notion that *"attachment behavior [characterizes] human beings from the cradle to the grave"* (Bowlby, 1979/1994, p. 129). According to Antonucci, Akiyama, and Takahashi (2004), convoy relationships such as the relationships to relatives, peers, or spouses have the role to shape and protect individuals. And furthermore, they fulfill the function of sharing experiences and challenges as well as good and bad times in life.

The relationship to the parents normally represents the first relationship experience in life which is of fundamental and existential meaning for the development of human beings. Parents have the function to soothe the central needs of a newborn (i.e., nourishment, caring, protection) and therefore are responsible for the child's survival of the first life passage (Bretherton, 1992). During childhood and adolescence, peer relationships become more and more important (cf. Brown & Larson, 2009). While comparing child-parent- and peer-relationships, one major difference points to the level of reciprocity. Whereas the child-parent relationship is rather described by the child' dependency, peer relationships are more strongly reciprocal and in most of the cases, individuals are on a par with each other. The latter goes along with adolescents' striving for autonomy and independence (Steinberg, 2005; Steinberg & Morris, 2001). Romantic relationships represent the most intimate form of relationships and constitute an important environmental context in adulthood (Neyer, Mund, Zimmermann, & Wrzus, 2013). Hazan and Shaver (1987) proposed that intimate relationships fulfill comparable functions as attachment relationships in childhood. However, a big difference refers to the circumstance that intimate partners represent both passive and active creators of

attachment. Thus, this matter of fact implies that the influence of intimate relationships on individual development needs to be approached by a dyadic focus. Or more general, in order to describe the relationship between an individual and the environment, a reciprocal perspective should be considered.

1.2.3. Interaction between Personality and Context

Derived from the latter, it might be required to shift the focus from "development of the individual in the environment" to the "co-development between the individual and the environment". Related to this idea is the assumption that the development of individuals is not the product of environmental influences but that individuals are active creators of their environments, and, in turn, of their development. Already Allport (1937) suggested that individuals actively select environments that are convenient with their personality. Thus, aspects of the individual and the environment are assumed to interact with each other.

Dynamic Interactionism

The theory best describing this idea in the context of personality-environment interactions refers to the theory of dynamic interactionism (cf. Caspi, 1998) postulating a permanent interaction between the individuals' personalities and their environment that can be described by different transaction mechanisms (Back et al., 2011; Buss, 1987; Caspi, 1998; Caspi & Roberts, 2001; Plomin, DeFries, & Loehlin, 1977). The reactive transaction describes that individuals with different personality structures vary in the way they experience, interpret, and react to the same environment. For instance, it might be that neurotic individuals interpret relationship conflicts as a threat, whereas emotionally stable individuals take it as natural occurrence in relationships. In addition, the evocative transaction describes that individuals elicit different behaviors from their interaction partners dependent on their personality. For example, agreeable individuals might promote harmonious partner behavior. Furthermore, the proactive transaction defines the phenomenon

that individuals with different personality structures select distinct environments (Caspi & Roberts, 2001). It could be that an open individual chooses an intimate partner who shares his or her dream of travelling around the world.

Personality-Relationship Transactions

A specific constellation of the dynamic interactionism refers to personality-relationship transactions (Neyer et al., 2013) describing a reciprocal interaction between personality traits and relationship aspects such as relationship satisfaction. Thus, from this, it is assumed that personality traits influence relationship satisfaction and vice versa. By adding a dyadic focus, it might be expected that the interactions do not only occur within individuals but also between individuals. Furthermore, it is suggested that the relationship satisfaction of both partners are outcomes of their shared environment. Thus, relationship satisfaction needs to be examined by means of a dyadic approach.

Multiple studies have found cross-sectional and longitudinal associations between the Big Five traits and relationship satisfaction of individuals and their partners (e.g., Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Malouff, Thorsteinsson, Schutte, Bhullar, & Rooke, 2010). Therein, neuroticism has been reported to be one of the most prominent predictors of relationship dissatisfaction (e.g., Karney & Bradbury, 1995; Roberts et al., 2007). In turn, positive associations have been consistently reported between agreeableness and conscientiousness and relationship satisfaction, whereas the associations for extraversion and openness are less clear (e.g., Dyrenforth et al., 2010, Malouff et al., 2010; Neyer & Voigt, 2004; White, Hendrick, & Hendrick, 2004). Hogan and Roberts (2004) proposed that low neuroticism and high agreeableness and conscientiousness are characteristics of a mature personality. In turn, individuals with a mature personality are known to be more willing to invest in and to commit to their intimate relationships and thus maintain a good relationship with their partners (Lodi-Smith & Roberts, 2007; Roberts & Wood, 2006).

Although research on associations between global self-esteem and relationship satisfaction plays a less prominent role in the literature of intimate relationships, findings from cross-sectional studies indicate both positive intra- and inter-individual associations between self-esteem and relationship satisfaction (e.g., Erol & Orth, 2013). Furthermore, based on individual data, Orth, Robins, and Widaman (2012) found that self-esteem predicted level as well as change in relationship satisfaction.

Previous research on personality-relationship satisfaction associations lacks with respect to several aspects. First, most of the studies did not use longitudinal dyadic analyses between personality traits and relationship satisfaction in which the stability of personality and relationship characteristics of both partners was controlled. Second, the majority of previous studies were based on the Big Five traits. Less is known about dyadic longitudinal associations between self-esteem and relationship satisfaction. Third, despite its dyadic nature, relationship satisfaction was mostly modeled as individual variable.

1.3. Methodological Considerations

The current thesis is based on dyadic and longitudinal data, as well as on different perceptions of personality traits in the context of intimate couples. This implies several methodological considerations. In the following, four models that were applied in the current thesis are briefly introduced. All models are based on structural equation modeling (SEM).

1.3.1. Latent Growth Curve Model

For the modeling of developmental trajectories and inter-individual variability in intra-individual change (Nesselroade & Baltes, 1974), the Latent Growth Curve Model (LGCM; cf. McArdle, 2009) is an appropriate model. Based on three measurement occasions as in Study 1, a linear LGCM including a latent intercept and latent slope is advisable. The intercept factor refers to the starting value of the construct at the first measurement occasion and is usually scaled by constraining all loadings from the intercept to the repeated occasions

at values of 1. The slope factor comprises the change across time, thus the developmental trajectory. Under the condition that the time lag between the measurement occasions is equal, the loadings of the slope factor are typically fixed to 0 (T1), 1 (T2), and 2 (T3). The intercept and slope factor provide four information that are of main interest. First, the intercept mean indicates at which average level of the construct the individuals start at the first measurement occasion. Second, the intercept variance determines whether the individuals significantly differ from each other with respect to their starting value. Third, a significant slope shows that individuals on average increase (positive slope) or decrease (negative slope) across the measurement occasions. A non-significant slope indicates that the group of individuals remains stable on average. Fourth, the slope variance indicates whether inter-individual differences in intra-individual change occurred. In addition, by means of the covariance between the intercept and slope, one can evaluate whether the starting level is associated with the developmental trajectory. The establishment of a second-order LGCM in which the values of the constructs are built on a latent basis has the advantage that estimations are free from measurement error. In Study 1, we applied the parceling procedure suggested by Little, Cunningham, Shahar, and Widaman (2002) which was based on the item-to construct balance technique.

1.3.2. Actor-Partner Interdependence Model

Couple data is of dyadic nature. This means that the data between the two relationship partners is non-independent (Kenny, Kashy, & Cook, 2006, p. 4). Therefore, it is important to consider the dependency of dyadic data and to define the couple - instead of the individual - as the level of analysis. An established model in research on dyadic data refers to the Actor-Partner Interdependence Model (APIM; Kenny et al., 2006). The simplest APIM type includes one manifest independent and one outcome variable for both members of the dyad. This model estimates six parameters. First, there is a covariance between the two independent

variables and one between the two residuals of the dependent variables. Second, the model estimates four regression paths comprising of two so-called "actor effects" and two "partner effects". The actor effect captures the within-person association, whereas the partner effect demonstrates the between-person association between the independent and outcome variables (Kenny et al., 2006).

Cross-sectional APIM

In the current thesis (Study 2), we modeled the cross-sectional APIM on a latent basis. As in Study 1, we built parcels according to the item-to construct balance technique (Little et al., 2002). By means of the latent modeling, it is assured that the constructs in the model are uncontaminated by measurement error. Furthermore, we set the factor loadings for women and men to be equal, thus, establishing metric invariance that allows for the interpretation of standardized regression coefficients between the latent constructs (cf. Bontempo & Hofer, 2007). In addition, we allowed for correlated uniqueness for the matching parcels between women and men. In our APIM model in Study 2, we tested whether the actor and partner effects were statistically different or equal for women and men. In doing so, we applied model comparisons by means of nested χ^2-difference-tests ($\Delta\chi^2$) and compared a model in which we freely estimated the actor and partner effects for women and men against a model in which we constrained the effects to be equal. As the two models did not substantially differ in model fit and for reasons of parsimony, we used the constrained models.

Longitudinal APIM

In Study 4, we had the goal to examine longitudinal intra- and inter-individual associations between personality traits (neuroticism and self-esteem) and relationship satisfaction. We were interested to find out whether neuroticism and self-esteem were predictors or outcomes of relationship satisfaction and whether the associations represented within- or between-person effects. Therefore, we adapted the APIM into a longitudinal

design with four predictors and four outcome variables (personality traits and relationship satisfaction of women and men at T1 and T2). The longitudinal APIM has the particular advantage that it examines the longitudinal intra- and inter-individual associations between the variables while controlling for the stability of the constructs.

1.3.3. Latent Congruence Model

A widespread topic in dyadic analyses refers to the level of similarity or congruence between aspects of intimate partners. However, the most previously used methods for assessing such phenomena are widely criticized (Cheung, 2009a; 2009b; Edwards, 2001; 2009). Therefore, we adapted and extended a relatively novel methodological approach for analyzing congruence and discrepancy phenomena with respect to Study 3 in which we were interested in associations between personality perception discrepancies and relationship satisfaction. The Latent Congruence Model (LCM; Cheung, 2009b) consists of a level and a discrepancy factor that are based on mean rating (level) and rating difference (discrepancy) between two different indicators as between the latent self- and partner-perception and partner- and meta-perception of the Big Five traits in Study 3. The loadings of the LCM level indicators are fixed two 1. The loadings of the first discrepancy indicator is fixed to -0.5, whereas the loading of the second indicator is fixed to +0.5. To consider the dyadic structure of our data, we established a double LCM in Study 3 consisting of two level and two discrepancy factors for women and men. The level and discrepancy factors were allowed to correlate.

1.3.4. Common Fate Model

In Study 4, we conceptualized relationship satisfaction as environmental outcome of the two intimate partners. Following the idea that relationship satisfaction of both intimate partners represents a form of environmental climate, we came across with the Common Fate Model (CFM; Kenny & La Voie, 1985; Ledermann & Kenny, 2012). The idea behind the

CFM is that there are variables representing shared external factors or common relational variables that are assumed to have an effect on both dyad members (Ledermann & Kenny, 2012). The modeling of the CFM is relatively straightforward. Thus, illustrated by Study 4, the relationship satisfaction scores of women and men were used as indicators (loadings fixed at value 1) for a latent factor involving the aspects of relationship satisfaction of women and men that are likewise felt or perceived by both partners.

1.4. The Current Work

Derived from theory and previous research, three open questions arise that point to the four empircial studies of the current thesis. In the following, the open questions are presented accompanied by a brief overview of the studies.

1.4.1. Overview of Study 1

The first question addresses *how self-evaluative traits develop in the transition to early adolescence?* The transition from late childhood to early adolescence represents an important transitional phase in the life span biography of individuals. As the period is characterized by various changes on different levels, the questions of how self-representations develop on average as well as how the development differs with respect to biological and contextual factors are of great interest. Study 1 differentiates between the development of global and domain-specific self-representations and investigates the effects of pubertal development and school transition on self-esteem and self-concepts. Study 1 is based on longitudinal data of 205 adolescent children who were interviewed at three measurement occasions over two years (mean age at T1 = 10.6 years). The main analyses will be based on Latent Growth Curve models (LGCM) of global self-esteem and the four domain-specific self-concepts of academic competence, social acceptance, physical attractiveness, and behavioral conduct.

1.4.2. Overview of Studies 2 and 3

The second question explores *how self-, partner-, and meta-perceptions of the Big Five traits as well as their discrepancies are related with relationship satisfaction of intimate couples?* Personality traits can be captured from different perspectives such as from the self-, partner-, and meta-perception. Study 2 and 3 focus on related and distinct aspects of the three perspectives and their role for relationship satisfaction.

Study 2 has the goal to investigate the relatedness and distinction between the self-, partner-, and meta-perception and their dyadic associations with relationship satisfaction. The cross-sectional study is based on dyadic data coming from a sample of 216 couples ranging in age from 16 to 92 years. The question of the relatedness and distinction of the three perspectives will be explored by following statistical approaches. First, convergent validity of the three perspectives will be analyzed. Second, one-, two-, and three-factor models treating the three perspectives as either separate or common constructs will be compared by means of confirmatory factor analyses (CFA). Third, incremental validity will be examined. With respect to the question of different associations between the three perspectives on personality traits and relationship satisfaction, latent Actor-Partner Interdependence Models (APIM) will be established that consider the dyadic nature of the data and distinguish between intra- and inter-individual associations (i.e., actor and partner effects).

Study 3 focuses on associations between self-partner- and partner-meta-perception discrepancies of neuroticism, agreeableness, and conscientiousness and relationship satisfaction. To date, partner-meta-perception discrepancies are not well researched. The discrepancy models will be based on a dyadic extension of the Latent Congruence Model (LCM) involving two latent factors that capture the mean of and discrepancy between two different sources of the same construct such as the self-partner- and the partner-meta-perception of neuroticism, agreeableness, and conscientiousness in Study 3. By adding

relationship satisfaction of the two intimate partners into the models, intra- and inter-individual associations between level and discrepancy of the personality perceptions and relationship satisfaction can be assessed. Thus, Study 3 has the goal to introduce a dyadic adaptation of a rarely used method for capturing discrepancies between different personality perspectives based on structural equation modeling. Study 3 is a follow up study of Study 2 and is based on the identical sample of intimate couples.

1.4.3. Overview of Study 4

The third question investigates *whether neuroticism and self-esteem are predictors or outcomes of relationship satisfaction and relationship climate?* Although it is assumed that intimate relationships represent an important developmental context, the studies that investigated dyadic effects of relationship satisfaction on personality are limited. Most of previous studies that examined the link between personality traits and relationship satisfaction primarily looked at personality effects on relationship satisfaction and less vice versa. Study 4 is interested in the question whether personality traits serve as both predictors and outcomes of relationship satisfaction depending on the function of personality trait one consider. The study focuses on neuroticism and self-esteem as two personality traits that are theoretically related, but also distinct. Furthermore, the study has the goal to investigate the interplay between the two personality traits and individual and shared aspects of relationship satisfaction. The study is based on longitudinal data across two measurement occasions over two years and includes data of 141 intimate couples with a broad age range. The analyses will be based on dyadic cross-lagged models including neuroticism, self-esteem, and relationship satisfaction at T1 and T2 of women and men in a relationship. The models will control for the stability of the two personality constructs and relationship satisfaction. In a second set of models, relationship satisfaction of women and men will be modeled as shared relationship satisfaction by means of a Common Fate Model (CFM).

2. PERSONALITY DEVELOPMENT IN ADOLESCENCE

2.1. Study 1: The Development of Self-Representations During Early Adolescence: The Role of Gender, Puberty, and School Transition[1]

2.1.1. Introduction

Early adolescence is a transitional period that is characterized by significant biological, cognitive, and social changes (Collins & Steinberg, 2008). Most of these changes have the power to initiate early adolescents' involvement with their self. With puberty and its physical and hormonal changes, involvement with the maturing body and gender roles may start. In terms of cognitive development, the increasing ability for abstract thinking is related to processes of identity and self-image building (Steinberg, 2005). The importance of peer relationships increases and as a result the acceptance of peers becomes fundamental for adolescents' self-development (Brown & Larson, 2009). Further, the transition from primary to secondary school takes place and causes shifts in social peer networks and academic requirements. Thus, early adolescence seems to be a period in life that is highly relevant for the self-development.

Self-representations such as global self-esteem or domain-specific self-concepts are defined as attributes of the self that individuals use to describe themselves (cf. Harter, 2012). *Global self-esteem* relates to individuals' feelings and appraisal of themselves as persons (Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995). In contrast, *domain-specific self-concepts* consist of individuals' beliefs about themselves and refer to appraisals of one's value in a particular domain (Bosson & Swann, 2009; Harter, 2006a; 2006b). Self-representations are associated with important life outcomes such as mental and physical health and life satisfaction (Proctor, Linley, & Maltby, 2009; Trzesniewski, Donnellan,

[1] A similar version of this chapter is currently in revision at „The Journal of Early Adolescence" (Schaffhuser, Allemand, & Schwarz)

Moffitt, Robins, Poulton, & Caspi, 2006). For instance, Steiger, Allemand, Robins, and Fend (2014) demonstrated that both level and change of adolescent global self-esteem predicted depression two decades later. Thus, the investigation of self-representations in adolescence is of central interest. The current study contributes to previous literature by examining both trajectories of global self-esteem and domain-specific self-concepts in the sensitive period between late childhood and early adolescence. The study stands out by its focus on gender, puberty, and school transition and their role for adolescent self-development.

Pubertal Development in Early Adolescence

Pubertal development is characterized by pronounced variability not only between but also within gender groups (Marceau, Ram, Houts, Grimm, & Susman, 2011). Two aspects of pubertal development can be distinguished. *Pubertal timing* captures individual differences in the onset of pubertal development and indicates the individuals' stage of physical maturity relative to their same-sex peers. *Pubertal tempo* refers to the time taken to pass through the subsequent stages of pubertal development (Mendle, Harden, Brooks-Gunn, & Graber, 2010). Consistent with the maturational deviance hypothesis (Alsaker, 1995) postulating negative effects of deviations from normative development on psychological outcomes, there is some evidence indicating that deviations from normative pubertal timing are related with internalizing and externalizing problems as well as academic disadvantages, particularly for girls (e.g., Graber, Lewinsohn, Seeley, & Brooks-Gunn, 1997). Negative psychological effects of fast pubertal tempo have been reported for boys (Mendle et al., 2010). Thus, pubertal timing and tempo might be relevant to explain individual differences in self-development.

School Transition in Early Adolescence

The transition from elementary to middle or secondary school is an especially challenging life experience due to related consequences such as shifts in social network compositions (cf. Donnellan, Trzesniewski, & Robins, 2006). Furthermore, children are confronted with harsher evaluative feedback related to achievement and behavior, and with higher competition and performance pressure (Eccles et al., 1993). In addition, a school transition during the onset of pubertal development has been described as a stress factor due to a mismatch between changes in emotions and needs of early adolescents and their new school environment (Cole et al., 2001; Eccles et al., 1993). Thus, academic, social, or behavioral self-concepts might be negatively affected by the school transition.

Development of Global Self-Esteem in Early Adolescence

With respect to mean-level changes, previous findings are inconsistent. Some studies reported that the global self-esteem is relatively high in childhood, decreases during early adolescence and increases in later adolescence and throughout adulthood (e.g., Twenge & Campbell, 2001; Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002). Other studies suggested that self-esteem increases during adolescence (Erol & Orth, 2011). However, there is also evidence that the global self-esteem remains stable across adolescence (Kuzucu, Bontempo, Hofer, Stallings, & Piccinin, 2013).

Another line of evidence refers to whether individuals maintain their relative standing on a self-representation dimension relative to others over time. With respect to rank-order stability of global self-esteem, previous work reported low to moderate stability coefficients in early adolescence (years 10-13: range r = .40-.50), but increases in rank-order stability during adolescence (Trzesniewski, Donnellan, & Robins, 2003). With respect to gender differences, multiple studies found a higher global self-esteem level for male as compared to female adolescents (Kling, Hyde, Showers, & Buswell, 1999; Robins & Trzesniewski, 2005;

Young & Mroczek, 2003). Furthermore, findings suggest that girls are more likely to experience steeper decreasing trajectories than boys (Block & Robins, 1993; Zimmerman, Copeland, Shope, & Diehlman, 1997).

Although much research has been done with respect to the development of global self-esteem, very little is known about the role of puberty and school transition on self-development in early adolescence. On the one hand, Buchanan, Eccles, and Becker (1992) stated that there is no clear evidence for an effect of pubertal development on global self-esteem in adolescence. On the other hand, the most vulnerable period for a potential effect of puberty on global self-esteem might be in early adolescence. There is first evidence for this idea. For example, Williams and Currie (2000) found that early maturing was only related to lower global self-esteem among 11-year old girls while among 13-year old girls no such relation was found. Wichstrøm (1998) found the same effect for girls and boys, however, his sample consisted of older adolescent boys and girls. Previous work on the role of school transitions in early adolescence suggests a negative effect on development of global self-esteem (Seidman, Allen, Aber, Mitchell, & Feinman, 1994; Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991). Moreover, there is preliminary evidence suggesting that this negative effect is more pronounced for girls than for boys (Zimmerman et al., 1997).

The current study extends previous literature in several ways. First, we focused on global self-esteem development in the sensitive period between late childhood and early adolescence. Second, we investigated different indicators of pubertal development within a longitudinal design. Third, school transition effects were examined in two groups of children that experience the transition at two different time points. Based on previous research, we expected a negative effect of early puberty and school transition on global self-esteem.

Development of Self-Concepts in Early Adolescence

Fewer studies have investigated the development of various domain-specific self-concepts and the results are mixed. The *academic self-concept* tends to decrease at the mean-level in early adolescence (Cole et al. 2001, Wigfield et al., 1991), but then recovers in middle and later adolescence (Cole et al., 2001). In contrast, a recent study suggests a linear increase between the ages 9 to 16 years (Kuzucu et al., 2013). With respect to rank-order stability, Cole et al. (2001) found that the rank-order stability of early adolescents decreased over six months. There is evidence that boys score higher with respect to academic self-concept than girls (Young & Mroczek, 2003) and that the transition from elementary to middle school is associated with a decrease in the academic self-concept, particularly in girls (Anderman & Midgley, 1997; De Fraine, Van Damme, & Onghena, 2007; Molloy, Ram, & Gest, 2011). To the best of our knowledge, no study so far has systematically examined puberty effects on the development of the academic self-concept.

The *social self-concept* tends to demonstrate a mean-level increase in early adolescence (Kuzucu et al., 2013; Molloy et al., 2011), but a decrease with respect to the rank-order stability from grades 6 to 7 (approximately ages 11 to 12 years) (Cole et al., 2001). Empirical evidence suggests that girls and boys do not differ with respect to their social self-concept (Cole et al., 2001). Moreover, Cole et al. (2001) reported that during the transition from middle to high school the increase in the social self-concept was smaller than before the transition. No study so far has examined the influence of puberty on the social self-concept.

Mixed results were found for the *physical self-concept*. Whereas Cole et al. (2001) did not find changes at the mean-level, Kuzucu et al. (2013) reported decreases. The rank-order stability tends to decrease in early adolescence (Cole et al., 2001). Moreover, it seems that girls' physical self-concept is lower compared to boys even in late childhood, decreases further until middle adolescence and thus, remains lower across adolescence (Cole et al.,

2001; Gentile et al., 2006; Young & Mroczek, 2003). No school transition effects on the development of the physical self-concept in early adolescence were found (Cole et al., 2001).

Recently, Kuzucu et al. (2013) found decreases in the *behavioral self-concept.* Young adolescents become less secure in their behavioral system as they are confronted with individual and contextual changes such as new social roles and changed contexts. Cole et al. (2001) reported that the rank-order stability of the behavioral self-concept became increasingly stable across early adolescence. Previous work found remarkable gender differences with girls having a more positive behavioral self-concept than boys (Gentile et al., 2006). Moreover, school transitions tended to slow down the decrease of the behavioral self-concept (Cole et al., 2001). So far, no previous study has investigated the role of puberty on the behavioral self-concept of early adolescents.

The mixed empirical evidence about the development of self-representations in early adolescents and underrepresented research on possible effects of puberty and school transitions points to the need of systematic work on self-development in the specific period of early adolescence. In addition, more information is needed to explain individual differences in the development of self-representations. Such findings are still scarce. As outlined before, gender, puberty, and school transitions reflect promising candidates to explain individual differences in the development of self-representations.

The Present Study

The existing literature is limited by studies that systematically investigated the development of global and particularly that of domain-specific self-representations in the transitional period between late childhood and early adolescence. In addition, the role of pubertal timing and tempo is not clear with respect to the development of self-representations. Furthermore, the current study established a novel methodological approach to analyze school transition effects on both level and change of self-representations within

two groups of children that experience the transition at two alternative time points. Thus, the current study stands out by examining both biological (puberty) as well as contextual factors (school transition) in order to explain inter-individual differences in self-development.

The present study examined mean-level change and rank-order stability of global self-esteem and four domain-specific self-concepts (i.e., academic competence, social acceptance, physical attractiveness, behavioral conduct) in the transition from late childhood to early adolescence. We tested five hypotheses. With respect to *mean-level*, we expected decreases in global self-esteem, academic competence, physical attractiveness, and behavioral conduct, but an increase in social acceptance (H1). With respect to meta-analytical findings of *rank-order stability* in terms of global self-esteem (Trzesniewski et al., 2003), we expected moderate stabilities of the self-representations (i.e., r = .40-.50) (H2). With respect to *gender effects*, we expected that boys have higher mean levels in global self-esteem, academic competence and physical attractiveness, but lower behavioral conduct scores compared to girls (H3.1). In addition, we expected that girls experience steeper decreases with respect to global self-esteem, academic competence and physical attractiveness (H3.2). No gender differences were expected for the domain-specific self-concept of social acceptance. With respect to *pubertal development*, we expected negative effects of early pubertal timing for girls and fast pubertal tempo for boys on global self-esteem (H4). With respect to *school transition*, we expected negative effects of school transition on global self-esteem and the academic self-concept. We expected stronger negative school transition effects for girls on all aspects of self-representation (H5).

2.1.2. Methods

Procedure and Participants

Data come from the Swiss longitudinal study "Family Stress in the Transition into Puberty" and included three measurement occasions over two years. Trained interviewers

conducted standardized interviews with the adolescents and their mothers. The current paper focused on the reports of the adolescents. The original sample in 2008 (T1) consisted of 246 children and their mothers. In 2009 (T2), 228 families participated (attrition rate of 7.3%) and 208 participated again in 2010 (T3; attrition rate of 8.8%). The present study based on 205 children with complete data on the variables of interest. The sample consisted of 104 girls (50.7%) and 101 boys with a mean age of 10.60 years (*SD* = .40) at T1, 11.62 years (*SD* = .40) at T2 and 12.64 years (*SD* = .38) at T3.

Measures

Global self-esteem and self-concepts. The Self-Perception Profile for Children (SPPC; Harter, 1985; Wünsche & Schneewind, 1989) was used to assess global self-esteem and the domain-specific self-concepts of academic competence, social acceptance, physical attractiveness, and behavioral conduct. Every subscale consisted of six items in the format of structured-alternative questions (e.g.,*"Some kids are happy with themselves… BUT… other kids are unhappy with themselves"*). The participants had first to decide which of the two alternatives describe them better. Then, they had to evaluate whether the chosen alternative is "sort of true" or "really true" for them. The answer format is equivalent to a 4-point scale. Alpha reliability estimates across the three measurement occasions were: .68-.76 (global self-esteem); .79-.86 (academic competence); .79-.83 (social acceptance); .75-.87 (physical attractiveness); .67-.80 (behavioral conduct).

Pubertal status. Three items from the German adaptation of the Pubertal Development Scale (PDS; Petersen, Crockett, Richards, & Boxer, 1988; Watzlawik, 2009) were used to assess children's pubertal status (items for *girls*: pubic hair, breast development, menarche; items for *boys*: pubic hair, facial hair, voice changes). Participants rated the items on a 4-point Likert-type scale (1 = not yet started to 4 = seems complete). The response format for the menarche item was presented by means of a dichotomous format (1 = no/2 = yes). By

means of the PDS sumscore, the pubertal status was separately calculated for girls and boys and transformed into a 5-point Likert-type scale (1 = prepubertal to 5 = postpubertal). Alpha reliability estimates for girls were: .45 (T1), .61 (T2), and .69 (T3), and for boys were: .28 (T1), .54 (T2), and .66 (T3). The very low alpha reliability for boys at T1 was due to the restricted variance in pubertal development at this age (see Table 1). We decided to exclude the T1 PDS data for boys for the subsequent analyses.

Pubertal timing. Children were asked about their perceived pubertal timing in comparison to their same-sex peers using a single-item (Silbereisen & Schwarz, 1996). On a 5-point Likert-type scale they rated their body development in reference to that of their peers (1 = much earlier to 5 = much later). In order to validate this single-item measure, we correlated it with an indicator of actual pubertal timing. To do so, the PDS-scores were transformed into the stage of early (-1*SD* from PDS mean), on-time ($\leq$ -1 *SD* $\geq$ 1 *SD* from PDS mean) or late pubertal timing (+1*SD* from PDS mean). The two scores were significantly related to each other for girls (r's = -.35 to -.46, p's < .001). Only one significant correlation was found for boys at T3 (r = -.36, p < .001). The non-significant correlations for boys at the earlier measurement occasions might be related to the small variance with respect to the pubertal status of boys at this early stage of adolescence.

Table 1. *Descriptive Statistics for Pubertal Status and Perceived Pubertal Timing*

			Pubertal status									
	M (SD)	*M (SD)*	Pre-pubertal		Beginning		In the middle		Advanced		Post-pubertal	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
T1 PDS	2.34 (.83)	1.47 (.54)	23.1%	55.0%	20.2%	43.0%	56.7%	2.0%	-	-	-	
T2 PDS	2.91 (.66)	1.76 (.63)	3.9%	34.7%	14.6%	54.5%	68.0%	10.9%	13.6%	-	-	
T3 PDS	3.38 (.56)	2.25 (.70)	-	12.9%	2.9%	51.5%	57.3%	33.7%	38.8%	2.0%	1.0%	-
			Perceived pubertal timing									
	M (SD)	*M (SD)*	Very early		Early		On-time		Late		Very late	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
T1 timing	3.01 (.84)	2.93 (.74)	4.8%	4.0%	17.3%	19.0%	52.9%	57.0%	22.1%	20.0%	2.9%	-
T2 timing	2.95 (.87)	2.86 (.76)	7.7%	4.0%	13.5%	21.8%	58.7%	61.4%	16.3%	9.9%	3.8%	3.0%
T3 timing	2.96 (.85)	2.90 (.70)	6.7%	3.0%	14.4%	19.8%	57.7%	62.4%	18.3%	13.9%	2.9%	1.0%

Notes. N_{Girls} =103-104; N_{Boys} = 100-101.

Pubertal development. In line with the procedure suggested by Mendle et al. (2010), we used the longitudinal PDS scores to establish pubertal timing and tempo as latent factors separately for girls and boys (see Figure 1). Girls' timing and tempo factors were modeled with a latent growth curve model using the three pubertal status scores from T1-T3, whereby pubertal timing reflects the intercept (level) and pubertal tempo the slope (change) of pubertal development (see Figure 1B). The standardized estimates were: intercept: $M = 2.36$, $SE = .08$, $p < .001$; slope: $M = .52$, $SE = .04$, $p < .001$. The variance of the intercept (Var = .48, $SE = .11$, $p < .001$) was significant and the variance of the slope factor was marginally significant (Var = .06, $SE = .04$, $p = .087$).

To model boys' timing and tempo factors, only the T2 and T3 PDS scores were used (as described above). To establish the intercept (pubertal timing) and slope (pubertal tempo) for boys, we applied a latent congruence model (Cheung, 2009b). This model is depicted in Figure 1C. The estimates for the boys' pubertal development were: intercept: $M = 2.01$, $SE = .06$, $p < .001$; slope: $M = .49$, $SE = .06$, $p < .001$. The variances of the boys' intercept and slope factor were both significant: intercept: Var = .35, $SE = .05$, $p < .001$; slope: Var = .37, $SE = .05$, $p < .001$.

The results for girls and boys suggest an increase in pubertal status and individual differences in pubertal level and development. Intercept and slope were negatively interrelated in girls ($r = -.82$; $p < .01$), but unrelated in boys ($r = .12$, $p = .243$).

School transition. The present study is based on a sample from Switzerland, therefore the Swiss school system needs a brief explanation. The time of transition from primary to secondary school depends on the canton (federal state) in which the students attend school. In one of the two investigated cantons (Canton Basle-City), students make the transition after grade 4, whereas the students from the second canton (Canton Basle-Country) make the transition after grade 5. For the school transition analyses, we selected a subsample ($n = 156$)

of children who followed this normative school trajectory. One part of the subsample (n = 71; 45.5%) made the school transition between T1 and T2, whereas the second part of the subsample (n = 85; 54.5%) experienced the transition between T2 and T3.

Analytical Procedure

We conducted the statistical analyses in five steps. First, we performed separate second-order latent growth curve models to study the mean-level development of self-representations. The measurement models were based on three parcels per measurement point as manifest indicators. Parcels were built according to the item-to-construct balance technique (Little, Cunningham, Shahar, & Widaman, 2002). Factor loadings and intercepts were set to be equal across the three measurement occasions. Error variances between the respective parcels were allowed to correlate across the three occasions. Besides the latent growth curve model for social acceptance in boys, the covariance between the intercept and slope was not significant and thus was fixed to zero in the other models. Second, we estimated the latent stabilities of self-representations in terms of rank-order stability for each time interval and tested gender differences using multiple-group analyses. Third, we examined whether gender explained individual differences in intercepts and slopes of self-representations.

Fourth, we examined the role of puberty on self-representations, separately for girls and boys. Hence, we tested the effects of pubertal status and perceived pubertal timing on self-representations using these puberty variables as time-varying covariates. To reduce the model complexity, we fixed the non-significant covariances between pubertal status and timing and intercept and slope of self-representations to zero. The model for social acceptance in girls did not converge. As slope variance was not significant in girls, we used intercept-only-models in order to examine the effects on social acceptance at the respective measurement occasions. Furthermore, we investigated the potential effects of latent pubertal timing and

tempo on self-representations (see Figure 1). We used the pubertal timing and tempo factors of boys as predictors for intercept and slope of the self-representations, although boys' pubertal timing and tempo factors were only based on the puberty status scores at T2 and T3. However, we assumed that the pubertal timing and tempo across T2 and T3 would be representative for the individuals' general pattern of pubertal development (early versus late and slow versus fast maturers) during early adolescence. For the self-representations without significant slope variances, we only estimated the effects of pubertal timing and tempo on the intercept.

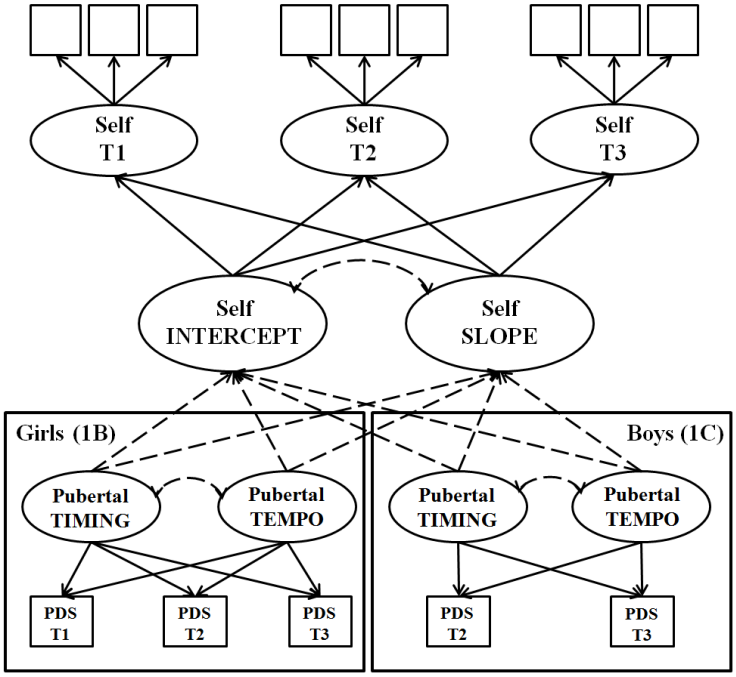

Figure 1. *Latent Growth Curve Model of Self-Representation Trajectories with Pubertal Timing and Tempo as Predictors*
Notes. Self = Self-Perception; PDS = Pubertal Development Scale.

Fifth, we examined possible effects of school transition on self-representations using a subsample (see above). To do so, we modeled latent congruence models for self-representations separately for the time lag T1-T2 and T2-T3, respectively, as the school transition occurred on two different time points in the two subsamples (see above). Then, we

used the dichotomous school variable (transition: 1 = yes or 0 = no) as a predictor of the intercept and slope of the self-representations (see Figure 2). We also examined possible effects of school transition in separate models for girls and boys.

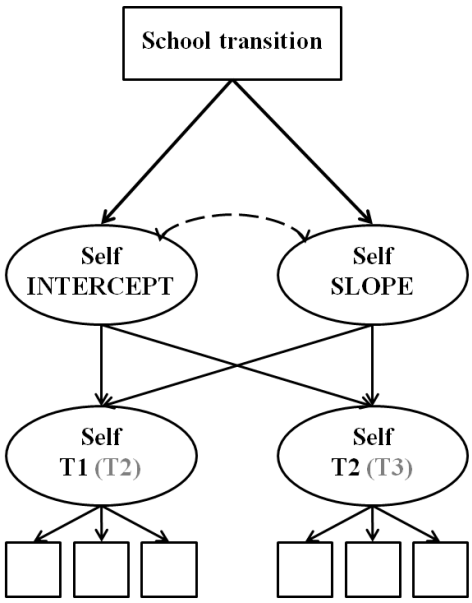

Figure 2. *School Transition as Predictor for Intercept and Slope of Self-Representations*
Notes. Self = Self-Perception.

The analyses were conducted using Amos version 21 (Arbuckle, 2007) and applying maximum likelihood (ML) estimation. Model fit was evaluated using the chi-square (χ^2), the comparative fix index (CFI) and the root mean square error of approximation (RMSEA). In general, CFI values above .95 and RMSEA values below .06 are typically applied to indicate if a model is adequately parameterized and reflects a good fit, although values above .90 and below .08 respectively, are acceptable (Browne & Cudeck, 1993; Hu & Bentler, 1999). Cohen's *d* was used as a measure of mean differences (Cohen, 1988).

Table 2. *Descriptive Statistics for Global Self-Esteem and the Self-Concept Domains*

		T1 (10.6 years)			T2 (11.6 years)			T3 (12.6 years)		
		M	*SD*	*d*	*M*	*SD*	*d*	*M*	*SD*	*d*
Global self-esteem	Total sample	3.28	.46		3.23	.50		3.14	.49	
	Girls	3.26	.52		3.20	.52		3.06	.51	
	Boys	3.30	.39	-.09	3.25	.48	-.10	3.23	.46	-.35*
Academic competence	Total sample	3.17	.55		3.14	.58		3.04	.57	
	Girls	3.20	.56		3.10	.60		2.98	.61	
	Boys	3.13	.53	.13	3.18	.57	-.14	3.10	.54	-.21
Social acceptance	Total sample	3.12	.53		3.13	.53		3.14	.55	
	Girls	3.12	.58		3.11	.55		3.11	.60	
	Boys	3.12	.49	.00	3.16	.50	-.10	3.16	.51	-.09
Physical attractiveness	Total sample	3.20	.51		3.07	.62		3.02	.61	
	Girls	3.14	.57		2.97	.66		2.83	.65	
	Boys	3.27	.45	-.25	3.17	.56	-.33*	3.23	.50	-.69***
Behavioral conduct	Total sample	3.07	.42		3.10	.43		3.09	.46	
	Girls	3.13	.41		3.10	.40		3.08	.47	
	Boys	3.02	.43	.26	3.09	.46	.02	3.09	.45	-.02

Notes. $N = 205$ ($N_{Girls} = 104$; $N_{Boys} = 101$); *d* = Cohen's *d* (mean of women – mean of men/pooled standard deviation); scale scores ranged from 1 to 4; *$p < .05$; **$p < .01$; ***$p < .001$.

Table 3. *Zero-Order Correlations among the Study Variables*

	1. Global self-esteem			2. Academic competence			3. Social acceptance			4. Physical attractiveness			5. Behavioral conduct			6. Pubertal status			7. Perceived pubertal timing		
	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
1.	-	-	-	**.49**	**.53**	**.48**	**.47**	**.53**	**.40**	**.69**	**.65**	**.63**	**.69**	**.71**	**.67**	.11	.16	-.00	**-.27**	-.16	-.15
2.	**.45**	**.58**	**.55**	-	-	-	**.45**	**.52**	**.33**	**.38**	**.51**	**.35**	**.49**	**.45**	**.51**	.12	.13	-.04	-.18	-.17	-.01
3.	**.56**	**.50**	**.60**	**.31**	**.35**	**.40**	-	-	-	**.45**	**.49**	**.22**	**.55**	**.49**	**.49**	-.09	.14	.16	-.10	**-.29**	**-.31**
4.	**.54**	**.67**	**.67**	.09	**.53**	**.40**	**.34**	**.45**	**.60**	-	-	-	**.52**	**.44**	**.43**	.06	.05	-.06	-.16	***-.23***	.01
5.	**.60**	**.69**	**.81**	**.55**	**.53**	**.58**	**.49**	**.47**	**.57**	***.21***	**.51**	**.51**	-	-	-	.12	.19	.14	***-.23***	**-.28**	**-.27**
6.	-.12	.10	-.09	-.17	-.08	-.04	-.04	-.01	-.01	-.05	-.03	-.10	-.16	.09	-.00	-	-	-	**-.38**	**-.44**	**-.45**
7.	***.25***	***.24***	-.05	***.24***	***.23***	.02	.13	.16	-.13	.13	.11	-.07	.13	.19	.06	-.11	-.18	**-.38**	-	-	-

Notes. N_{Girls} = 104; N_{Boys} = 101; correlations for girls above the diagonal; correlations for boys below the diagonal; higher scores in perceived pubertal timing indicate late timing; correlations in boldface and italics are significant at $\alpha = .05$; correlations in boldface are significant at $\alpha = .01$.

2.1.3. Results

Descriptive results are depicted in Table 2. Girls had significantly lower scores in global self-esteem at T3 than boys (d = .35), as well as with respect to the self-concept of physical attractiveness at T2 (d = .33) and T3 (d = .69). Table 3 shows the zero-order correlations among the study variables for each measurement occasion.

Mean-Level Change and Rank-Order Stability of Self-Representations

The model fits for the latent growth curve models were good (range χ^2 = 23.677-56.082, p's = .000-.538, df = 25, range: CFI = .968-1.000, range: RMSEA = .000-.078). The results are shown in Table 4. In line with our first hypothesis (H1), global self-esteem and the domain-specific self-concepts of academic competence and physical attractiveness significantly decreased over the two years, whereas no mean-level change was found for social acceptance and behavioral conduct. All intercept variances were significant suggesting individual differences in the levels of the self-representations. Moreover, the variances in the slope factors were also significant (although marginally significant for global self-esteem, p = .061), suggesting individual differences in the development of self-representations over time.

The model fits for the latent stabilities of the self-representations in terms of rank-order stability were good (range χ^2 = 22.234-52.583, p's = .000-.506, df = 23, range CFI = .970-1.000, range RMSEA = .000-.079). The results are shown in Table 4.With respect to global self-esteem, the stability coefficients were nearly in the expected range (range r = .42-.56, p < .001) (H2). However, the range for the rank-order stabilities of the domain-specific self-representations were larger (range r = .32-.72; p < .001). We estimated the average stability coefficients for the three time lags across the five domains using the Fisher's r-to-z transformation approach. The mean stability coefficients slightly increased over time (T1-T2: r =.54; T2-T3: r = .64; T1-T3: r = .44, p's < .01).

Gender Effects

There were no gender differences with respect to the mean-levels of self-representations (Table 4) (H3.1). However, girls and boys significantly differed in the development of global self-esteem, academic competence, physical attractiveness, and behavioral conduct (although gender did only marginally predict behavioral conduct, p = .069). In line with our hypothesis H3.2, all significant gender effects suggest that girls experienced steeper decreases in self-esteem and self-concepts than boys. With respect to gender differences in rank-order stability, girls had higher stability coefficients than boys with respect to global self-esteem and social acceptance (T1-T3) as well as in terms of physical attractiveness (T2-T3) (Table 4).

Table 4. *Results from the Latent Growth Curve Models*

	Latent growth curve models				Predictor		Latent stabilities		
	I Mean	I Variance	S Mean	S Variance	Gender I	Gender S	T1-T2	T2-T3	T1-T3
Global self-esteem	3.38	.06***	-.06***	.01^{+}	.06***	-.06***	.42***	.56***	.42***
Girls	3.37	.07**	-.09***	.00	.07**	-.09***	.39**	.52***	.51***^{a}
Boys	3.38	.05**	-.02	.03*	.05**	-.02	.49**	.61***	.30^{+b}
Academic competence	3.18	.16***	-.07***	.03*	.16***	-.07***	.65***	.74***	.58***
Girls	3.24	.21***	-.12***	.02	.21***	-.12***	.74***	.74***	.63***
Boys	3.14	.14***	-.02	.02	.14***	-.02	.56***	.74***	.56***
Social acceptance	3.09	.10***	.00	.00	.10***	.00	.61***	.57***	.48***
Girls	3.12	.15***	-.02	.00	.15***	-.02	.59***	.55***	.56***^{c}
Boys	3.06	.09***	.01	.01	.09***	.01	.65***	.59***	.37**^{d}
Physical attractiveness[1]	3.05	.09***	-.08***	.06***	.09***	-.08***	.44***	.72***	.32***
Girls	3.01	.12***	-.17*	.08*	.12***	-.17*	.46***	.75***^{e}	.36***
Boys	3.09	.04*	-.01	.04**	.04*	-.01	.37**	.64***^{f}	.19
Behavioral conduct	3.10	.05***	.00	.02*	.05***	.00	.53***	.62***	.37**
Girls	3.19	.06**	-.02	.01	.06**	-.02	.48**	.54***	.35***
Boys	3.00	.06**	.03	.02*	.06**	.03	.59***	.72***	.45**

Notes. [1] the latent growth curve models based on physical attractiveness contained a negative variance with respect to the latent factor at T3, but exhibited good model fits; I = Intercept; S = Slope; 1 = girls; 2 = boys; $^{+}p < .07$; *$p < .05$; **$p < .01$; ***$p < .001$; a > b, c < d, e < f, all p's < .05.

Pubertal Effects

Pubertal status and perceived timing (time-varying covariates). Pubertal status was not significantly related to any of the self-representations. Gender differences were found with respect to perceived pubertal timing. In specific, girls' perceived later timing was related to lower global self-esteem (T2: β = -.15, T3: β = -.21, *p's* < .05), social acceptance (T1: β = -.14, T2: β = -.18, T3: β = -.17, *p's* < .05), physical attractiveness (T2: β = -.22, T3: β = -.16, *p's* < .01), and behavioral conduct (T2: β = -.26, T3: β = -.28, *p's* < .01), whereas boys' perceived later timing was positively related to their global self-esteem at T1 (β = .28, p < .05) and academic competence (T2: β = .22, T3: β = .24, all *p's* < .05). Thus, the perception of early pubertal timing seems so be positively related to girls' self-representations which was not expected with respect to our hypothesis H4. However, the perception of early timing was negatively related to boys' self-representations.

Pubertal development (latent timing and tempo). Pubertal development was unrelated to the development of self-representations among girls. By contrast, boys' early pubertal timing was negatively associated with the intercept of global self-esteem (β = -.35, p < .05), social acceptance (β = -.24, p < .05), physical attractiveness (β = -.42, p < .05), and behavioral conduct (β = -.27, p = .050) suggesting that early pubertal timing was related to lower self-representations. Finally, boys' fast pubertal tempo was marginally related to the intercept and slope of behavioral conduct (intercept: β = -.25, p = .063; slope: β = .27, p = .059).

School Transition Effects

The results for the effects of school transition are summarized in Table 5. Consistent to our fifth hypothesis (H5), the school transition was negatively related to the slope of academic competence at both transition phases (T1 to T2: β = -.17, p = .075, T2 to T3: β = -.27, p < .01), suggesting that a school transition between the primary and secondary school

resulted in a more pronounced decline in the self-concept of academic competence. Moreover, the school transition from T1 to T2 negatively influenced the slope of global self-esteem (β = -.25, p < .01) and behavioral conduct (β = -.25, p < .01). Hence, experiencing a school transition is related to stronger decreases in global self-esteem and behavioral conduct. Further separate analyses for girls and boys demonstrated that these effects of self-development were primarily evident for girls (H5) (Table 5).

Table 5. *Standardized Regression Coefficients of the School Transition on the Intercept and Slope of Self-Representations*

		School transition between T1 and T2			School transition between T2 and T3		
		All	Boys	Girls	All	Boys	Girls
Global self-esteem	Intercept	.06	.05	.06	.05	.16	-.01
	Slope	-.25**	-.19	-.30*	-.10	.14	-.29*
Academic competence	Intercept	-.05	-.03	-.08	.02	-.03	.08
	Slope	-.17^{+}	.01	-.37**	-.27**	-.13	-.42***
Social acceptance	Intercept	-.02	-.07	.05	.11	.18	06
	Slope	-.12	-.12	-.20	.10	.09	.05
Physical attractiveness	Intercept	.10	.08	.11	-.07	-.06	-.05
	Slope	-.03	.09	-.14	-.05	.15	-.17
Behavioral conduct	Intercept	-.10	-.21	.05	.21*	.28*	.15
	Slope	-.25*	-.14	-.43**	.00	.12	-.11

Notes. $N = 156$; $^{+}p = .075$; $*p < .05$; $**p < .01$: $***p < .001$.

2.1.4. Discussion

The present study examined the role of gender, puberty, and school transition in the development of self-representations in early adolescence. This study complements and extends previous work in several ways. First, we examined a broad range of self-representations. Second, we used a unique data set that focused on early adolescent development as a sensitive transitional period between late childhood and adolescence. Third, we considered biological (i.e., puberty) and environmental factors (i.e., school transition) to explain individual differences in self-development. Our findings confirmed the majority of our expectations and will be discussed in detail below.

We found evidence for change and stability at the mean-level of self-representations. In accordance with previous work (e.g., Cole et al., 2001; Twenge & Campbell, 2001), we found a significant decrease in global self-esteem in early adolescence. This decrease might reflect an uncertainty related to the manifold biological and environmental changes in the transition to adolescence (cf. Eccles, 1999). The decrease in academic competence replicates previous research (e.g., De Fraine et al., 2007) and might be explained by increased performance pressure and achievement expectations as well as structural and social changes arising with the transition to secondary school (Eccles & Midgley, 1989). However, the current finding contrasts that of Kuzucu et al. (2013) who reported an increase in academic competence during adolescence. One possible explanation for the divergent findings can be found in the different longitudinal spans and age ranges of the two studies. Kuzucu et al. (2013) investigated a broader age range (years 9-16 years) than the current study. Therefore, one might assume that the negative school transition effects that might be strongly related to drops in academic competence in early adolescence (e.g., Eccles et al., 1993; Molloy et al., 2011) washes out during later stages of adolescence. The decline in physical attractiveness might be linked to negative body conceptions related to pubertal development (e.g.,

Tiggemann, 2005). We did not find mean-level changes for the social and behavioral self-concepts. This implies that despite the changes in social relationships and environmental expectancies, the adolescents were able to maintain their feelings of social embeddedness and behavioral self-confidence.

We found moderate rank-order stability coefficients for all self-representations. This result is in line with stability findings for the Big Five traits in the same developmental period (Roberts & DelVecchio, 2000). This finding supports the assumption that the stability of the self tends to be low in periods of environmental and maturational changes such as in early adolescence (Donnellan et al., 2006). Over the two years, the stability coefficients showed an increasing tendency. This might be related to the gain of advanced cognitive skills such as social comparison abilities that help adolescents to reflect on their self in a more abstract and realistic way which might promote stabilization (Steinberg, 2005).

Although no expected gender effects were found with respect to the mean-level, our results highlight gender differences in the developmental process. Girls demonstrated steeper decreases in global self-esteem, academic competence, and physical attractiveness as compared to boys. Based on our findings, one might assume that the gender-differential development of these self-representations starting in early adolescence may result in gender differences at a later stage of adolescence. The steeper decline in girls' academic self-concept replicates previous studies. It emphasizes the discrepancy between girls' perceived academic competence and their actual academic performance that has been reported to be equal or even higher than the performance in boys (e.g., Pomerantz, Altermatt, & Saxon, 2002). This contradiction might be explained by the tendency that boys overestimate themselves, whereas girls underestimate themselves in their academic competence (Cole, Martin, Peeke, Seroczynski, & Fier, 1999). Furthermore, it might be a product of gender-role intensification (Hill & Lynch, 1983), a theory suggesting that gender differences occur in gender-

stereotyped domains such as academics or appearance. The decrease in physical attractiveness was evident in girls. This is in line with evidence suggesting that particularly girls dislike body changes related to puberty development (McCabe, Ricciardelli, & Banfield, 2001).

Although pubertal status did no influence the self-representations, our results suggest effects of the adolescents' perceived pubertal timing. Perceived pubertal timing with reference to the same-sex peers incorporates a form of the looking glass perspective, a phenomenon closely linked to global self-esteem (Leary & Baumeister, 2000). Looking glass processes might be especially relevant in the transition to adolescence in which individuals develop the ability to integrate information from social comparison processes into one's self-concept (Steinberg, 2005). In general, girls' perceived later pubertal timing was related to lower self-representations. This result contradicts the findings of negative effects of early pubertal timing on internalizing behavior (Graber et al., 1997). However, research on pubertal timing is usually based on biological indicators in contrast to self-reported perceptions of peer comparisons. Given that the majority of girls in our sample already showed puberty signs a certain pubertal development seems normative in this age group. Thus, one could argue that girls who perceive themselves as late bloomers suffer from this status because it is not conform with their reference group.

In contrast, it is normative that boys are approximately two years behind girls in their pubertal development (Marshall & Tanner, 1986). Thus, it is assumed that the boys in our sample who experience first pubertal signs in late childhood tend to be rather uncommon with respect to their reference group. As such, the associations between boys' early pubertal timing and lower self-representation scores seem to be coherent. In accordance with this assumption, the pubertal timing analyses based on the longitudinal PDS scores showed significant associations between boys' early pubertal timing and lower scores of global self-

esteem, as well as lower physical and social self-concept. These results can be embedded into the maturational deviance hypothesis (e.g., Alsaker, 1995).

As expected, we found negative effects of the school transition on global self-esteem and academic competence. In addition, the self-concept of behavioral conduct was also negatively affected. Based on our results, the transition from primary to secondary school seems to be more adverse for girls than for boys. Since girls tend to underestimate themselves with respect to academic performance (Cole et al., 1999), the school transition might cause even more strain for them as they have to deal with new teachers, rules, and performance requirement. Additionally, the simultaneous occurrence of puberty onset and school transition has been shown to represent a disadvantageous interaction that has negative effects on the individuals' well-being (Ge & Natsuaki, 2009; Simmons & Blyth, 1987). Thus, as girls are by far more advanced in pubertal development, this negative interplay seems to play a more detrimental effect for girls than for boys.

Conclusions

In conclusion, our findings clearly support the assumption that the transition to adolescence is a sensitive period for self-development. Our findings demonstrate that the challenges of dealing with biological (perceived pubertal timing) as well as contextual (school transition) changes may explain individual differences in the levels and development of self-representations over two years. To the best of our knowledge, this is the first study that investigated effects of several puberty indicators on the development of self-representations. In the light of the fact that girls and boys differ with respect to the onset of their pubertal development, it is difficult to disentangle effects of gender and pubertal development. Future research should investigate developmental trajectories across longer time periods in order to examine puberty effects on self-development in boys who are in advanced pubertal stage comparably to that of the girls in the present study. Moreover, the

results demonstrated that the transition to a new school seems to be a particular challenging life experience in early adolescence which tends to go along with more negative self-representations among girls. Future research should examine the underlying processes linking the experience of a school transition and self-representations. Our results clearly demonstrated that gender, puberty, and school transition reflect important factors that help to better understand the development of self-representations in early adolescence.

3. PERSONALITY PERCEPTIONS OF INTIMATE COUPLES

3.1. Study 2: Personality Traits and Relationship Satisfaction in Intimate Couples: Three Perspectives on Personality[2]

3.1.1. Introduction

Relationship satisfaction is an important resource in adulthood. Satisfied individuals in long-term romantic relationships have happier, healthier, and longer lives (Diamond, Fagundes, & Butterworth, 2010). One important factor that may contribute to relationship satisfaction is personality. Indeed, a large body of cross-sectional and longitudinal research has consistently demonstrated that personality traits are associated with relationship satisfaction and marital success (Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Malouff, Thorsteinsson, Schutte, Bhullar, & Rooke, 2010; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). However, most existing research is largely based on personality self-perception and little is known about associations with relationship satisfaction using other personality perspectives. The present study sought to address this gap by examining the associations between three personality perspectives (*self-perception*: How individuals view their own personality, *partner-perception*: How individuals are viewed by their partner, and *meta-perception*: How individuals think they are viewed by their partner) and the relationship satisfaction of both intimate partners (*actor*: How satisfied individuals are with their relationship, *partner:* How satisfied partners of individuals are with their relationship).

Personality in the Context of Intimate Relationships

Personality traits refer to relatively enduring patterns of thoughts, feelings, and behaviors that distinguish individuals from one another (e.g., McCrae & John, 1992). They characterize how individuals think and feel about others and themselves in relation to others, how they typically perceive their social environment, and how they react to their interaction

[2] A similar version of this chapter has been accepted for publication in "European Journal of Personality" (Schaffhuser, Allemand, & Martin)

partners (cf. Back et al., 2011; Caspi & Roberts, 2001). Hence, it is suggested that personality traits play a central role in the context of intimate relationships. Indeed, a large body of previous research demonstrated associations between the Big Five personality traits and relationship satisfaction.

Neuroticism is one of the most prominent predictors of relationship dissatisfaction and divorce (Robins, Caspi, & Moffitt, 2000, 2002; Karney & Bradbury, 1995; Roberts et al., 2007; Watson, Hubbard, & Wiese, 2000a). Neurotic individuals generally report more negative affect, they have a greater sensitivity to negative events and experience less positive social interactions than emotionally stable individuals (Hampson, 2012; Watson & Clark, 1984).

Positive associations with relationship satisfaction have been reported for agreeableness and conscientiousness (Decuyper, De Bolle, & De Fruyt, 2012; Dyrenforth et al., 2010, Heller, Watson, & Illies, 2004; Malouff et al., 2010; Neyer & Voigt, 2004). Agreeable individuals tend to maintain positive relationships with others and engage in social behaviors that facilitate intimacy such as forgiveness (Branje, van Lieshout, & van Aken, 2005; Jensen-Campbell & Graziano, 2001; Steiner, Allemand, & McCullough, 2012). Highly conscientious individuals are better at controlling their impulses, typically follow norms and rules, and they are more task- and goal-directed (e.g., John & Srivastava, 1999).

Previous findings with respect to extraversion and openness to experience do not show a clear picture (Karney & Bradbury, 1995; Neyer & Voigt, 2004; Stroud, Durbin, Saigal, & Knobloch-Fedders, 2010; White, Hendrick, & Hendrick, 2004). However, some studies found weak but positive associations between extraversion and relationship satisfaction (Dyrenforth et al., 2010; Malouff et al, 2010). This might be due to the tendency of extraverted individuals having high levels of positive affect (Fleeson, Malanos, & Achille, 2002; Lucas & Diener, 2001), and being social, active, and joyful in interactions with others

(John & Srivastava, 1999). Additionally, extraverts tend to use more constructive coping strategies such as problem-solving (Carver & Connor-Smith, 2010).

The research findings with respect to openness are mixed with some studies reporting small positive or negative associations with relationship satisfaction or even non-associations (Karney & Bradbury, 1995; Malouff et al., 2010; Neyer & Voigt, 2004). Open individuals are characterized by a general desire to expand their experiences in life (John & Srivastava, 1999). One could assume that open individuals create an inspiring and stimulating relationship atmosphere that contributes to relationship satisfaction. By contrast, the need for gaining experiences could be related to relationship instability (Karney & Bradbury, 1995).

Three Perspectives on Personality

The majority of previous research on the associations between personality traits and relationship satisfaction is based on personality self-perceptions. However, taking a dyadic perspective, the interplay between personality and relationship satisfaction needs to be examined from different angles. We suggest that besides the self-perception, the partner- and meta-perceptions of personality are central as they involve specific information about how the individuals' personalities are expressed, perceived, and evaluated in the specific social environment of intimate relationships.

The *self-perception* of personality traits represents an explicit or implicit representation of the self (Back, Schmukle, & Egloff, 2009). It provides a unique view on personality traits from an inside perspective reflecting one's identity (Hogan & Roberts, 2004; Roberts & Wood, 2006). As in the current study, self-reports are used in order to assess explicit self-representations. Although self-reports contain the exceptional benefit for the acquisition of intra-psychic information, they are known to bear the risk of distorting the accuracy through self-enhancing and socially desirable responding styles (cf. Paulhus & Vazire, 2007). The *other-perception* of personality is based on observer reports by a close informant such as

the intimate partner as in the current study. Personality traits described from the outside perspective are known as reputations which demonstrate perceived personality traits represented by specific social partners of the individual (cf. Back et al., 2011; Hogan & Roberts, 2004; Roberts & Wood, 2006). Other-perceptions are assumed to be more objective and less biased by self-enhancing motives. Moreover, they may cover typical behavioral patterns that are not represented in the individual's self-perceptions, but evident in social interactions and therefore more salient to others (Hofstee, 1994; Roberts, Harms, Smith, Wood, & Webb, 2006; Vazire, 2010). There is ample evidence that other-perceptions are reliable and valid and provide relevant and unique information (Hofstee, 1994; Kolar, Funder, & Colvin, 1996; McCrae & Weiss, 2007; Roberts et al., 2006; Vazire, 2010). However, other-reports also comprise some disadvantages such as observer biases (Ready, Clark, Watson, & Westerhouse, 2000; Weller & Watson, 2009). In the following, we use the term "partner-perception" instead of "other-perception", because partner-reports were used in the current study.

The *meta-perception* of personality is underrepresented in the literature and especially in the context of intimate relationships. It uses the method of self-reports and refers to the individual's representations of and beliefs about how her or his personality is perceived by others (Carlson & Kenny, 2012; Laing, Phillipson, & Lee, 1966). Meta-perceptions can be understood as "perceptions of perceptions" (Srivastava, 2012, p. 91) and are assumed to be based on mind-reading and perspective-taking processes (Back et al., 2011; Back & Kenny, 2010; Carlson & Kenny, 2012; Kenny, 1994; Kenny & DePaulo, 1993). In order to generate meta-perceptions, individuals first have to elicit the knowledge of others about the own person and as a second step they need to evaluate how the other persons will weight that knowledge to build a personality judgment (Albright & Malloy, 1999). Similarly, other authors suggest that the process of generating meta-perceptions can be described by three

stages (Carlson & Kenny, 2012). First, individuals have to activate their self-perception (*How am I?*). Second, individuals need to recall self-observation information (*How do I behave?*). Third, individuals are assumed to integrate information from social feedback processes (*How do others respond to my person?).* Empirical evidence suggests that meta-perceptions are strongly influenced by self-perceptions (Kenny & DePaulo, 1993). However, the work of other authors demonstrated that the individuals' meta-perceptions represent realistic insights in their reputations (Carlson, Vazire, & Furr, 2011), indicating that meta-perceptions are distinct from self-perceptions.

Interrelations Between and Distinction of the Three Perspectives

Previous research found substantial associations between self- and other-reports of personality traits (*self-other agreement*; Back & Vazire, 2012) with correlations ranging from .40 to .60 (Vazire, 2006; Vazire & Carlson, 2010; Watson, Hubbard, & Wiese, 2000b). This was for example evident with respect to the overlap between self-reports and spouse-ratings (Decuyper et al., 2011; Vazire & Carlson, 2010). It has been suggested that high self-other agreements represent successful self-presentations (Baumeister, 1982; DePaulo, 1992). Although the reported associations between self- and other-reports were significant, they were moderate in size implying that the two methods contain shared and unique aspects of personality (Vazire, 2006). This assumption was supported by two recent studies reporting evidence for incremental validity of spouse- over self-ratings with respect to marital outcomes and symptoms of depression and personality disorders (Cundiff, Smith, & Frandsen, 2012; South, Turkheimer, & Oltmanns, 2008).

Recently, Vazire and Carlson (2010) reviewed different studies that examined the overlap between the other- and meta-perception (*meta-accuracy*; Back & Vazire, 2012) of personality traits in social contexts apart from intimate relationships. The overall correlation for the overlap was around .40, indicating substantial divergence between the two

perspectives. There is evidence that the level of the meta-accuracy is a function of acquaintance (Kenny, 1994). That is, the longer individuals know each other, the better is their appraisal about their reputation.

A strong correlation has been shown between individuals' self- and meta-perceptions (*self-meta-agreement;* Gallrein, Carlson, Holstein, & Leising, 2013), a finding that is linked to the general assumption that individuals tend to think that others see them as they see themselves (Kenny & DePaulo, 1993). This might be driven by the individuals' striving for a confirmation of their self-views by others (i.e., self-verification view; Swann, 2012). Alternatively, the strong correlation might be the product of a high conjunction between self-perception and actual behavior of individuals (Albright, Forest, & Reiseter, 2001). However, it has been shown that meta-perceptions also differ from self-perceptions (Carlson et al., 2011). As such, it is important to include meta-perception in addition to self- and partner-perceptions.

Shared Personality Effects on Relationship Satisfaction

From a traditional theoretical view on personality, it can be assumed that personality traits represent cognitive, emotional, and behavioral tendencies of individuals that are stable across time and situations (McCrae & John, 1992). This, in turn, should be reflected in an agreement between different personality perspectives. Based on that, it is expected that the self-, partner-, and meta-perception of personality have similar effects on social outcomes such as relationship satisfaction.

Let us imagine Laura, a neurotic young woman who is in a relationship with Simon. Why should the self- and meta-perception of Laura and the partner-perception of Simon contribute to the picture of Laura being a neurotic individual? First, Laura has access to a large pool of personality-related information about herself including memories of the past or self-reflections of the present (*self-perception*; cf. Hart & Matsuba, 2012). Thus, Laura might

be aware of the fact that she used to be a more anxious child as compared to her classmates and she probably knows that she worries a lot more about life than her best friend Susan. So, Laura's neuroticism is part of her identity (Hogan & Roberts, 2004). Furthermore, Laura usually tells Simon, when she feels down and she talks problems over with him. Mostly, Simon tries to calm Laura down and to assure her that she is making a mountain out of a molehill. So, from both her self-reflection as well as Simon's reactions, Laura knows that Simon sees her as pretty neurotic (*meta-perception*). In addition, Laura's neuroticism is directly represented in Simon (*partner-perception*), as Simon often experiences Laura as irritated and nervous, especially during stressful days which sometimes results in relationship conflicts. Therefore, as all three perspectives imply Laura's tendency to be neurotic, it is assumed that the self-, partner-, as well as the meta-perception of neuroticism have (negative) associations with both Laura's as well as Simon's relationship satisfaction, as it is related to intra- as well as interpersonal strain (Hampson, 2012).

Unique Personality Effects on Relationship Satisfaction

In addition to shared personality effects on relationship satisfaction, we suggest that the links between the self-, partner-, and meta-perception personality and relationship satisfaction are underlined by specific processes that might result in differential patterns of associations. Furthermore, the interplay between the three perspectives and relationship satisfaction has to be considered with respect to so-called actor and partner effects. *Actor effects* represent associations between an individual's personality and her or his relationship satisfaction, whereas *partner effects* capture the associations between the individual's personality and her or his partner's relationship satisfaction (Kenny, Kashy, & Cook, 2006).

By means of the virtual couple "Laura and Simon", Table 6 illustrates the underlying questions with respect to actor and partner effects between the three personality perspectives and relationship satisfaction.

Table 6. *Exemplary Questions with Respect to Actor and Partner Effects*

	Actor effect	Partner effect
Self-perception	Does Laura's personality self-view affect her own relationship satisfaction?	Does Laura's personality self-view affect Simon's relationship satisfaction?
Partner-perception	Does the way Simon views Laura's personality affect her relationship satisfaction?	Does the way Simon views Laura's personality affect his relationship satisfaction?
Meta-perception	Does Laura's perception of how Simon views her personality affect her satisfaction?	Does Laura's perception of how Simon views her personality affect his satisfaction?

Notes. In the current examples, Laura stands for the *actor* whereas Simon represents the *partner*.

First, it is assumed that *actor effects* between the *self-perception* of personality and relationship satisfaction are primarily based on a general inside perception and is related to coping styles and regulation processes. Every couple has to deal with relationship conflicts. However, the two partners in a relationship can differ a lot with respect to their reactions to that stressful situation depending on their personality and their way of coping (Hampson, 2012). Let's go back to Laura and Simon and let us speculate about their way of dealing with relationship conflicts. Whereas Laura's neuroticism could trigger a process of rumination and relationship problem focusing, and, in turn, decrease her relationship satisfaction, Simons' extraversion could function as mood regulator, as extraverted individuals typically experience positive affect. It might be that Simon calls a friend to meet him for a beer in order to stop being annoyed and to get over the argument with Laura. In turn, the individuals' coping and

regulation skills not only affect the feelings within the person, but also that of the partner (*partner effects*). One could assume that Laura's way of dealing with the conflict situation could also negatively affect Simon's relationship satisfaction. For instance, she might send him angry text messages.

Second, the *partner-perception* of personality is directly linked to the specific context of intimate relationships. Intimate couples share a wide array of situations in which individuals express characteristics of their personality. Thus, it can be hypothesized that the partner-perspective provides an additional picture of personality capturing particularly observable and social aspects of personality that become salient in relationship situations and that might reflect "blind spots" ("Johari window"; cf. Luft & Ingham, 1955) for the individual itself. From an actor effect perspective, a positive evaluation of one's personality by the partner might promote one's own relationship satisfaction (*actor effect*). From the related literature about partner enhancement, it is known that overly positive evaluations promote relationship functioning (Murray, Holmes, & Griffin, 1996a; 1996b; Rusbult, Finkel, & Kumashiro, 2009). From a partner effect perspective, the representation of a joyful partner might be positively related to relationship satisfaction as it is linked to positive relationship behavior and processes (*partner effect*).

Several studies reported both actor as well as partner effects between the self-perception of the Big Five traits and relationship satisfaction (Dyrenforth et al., 2010; Neyer & Voigt, 2004; Robins et al., 2000). In addition, a few studies found evidence for partner-reported personality traits and relationship satisfaction (Decuyper et al., 2012; Watson et al., 2000a). The finding that self- and partner-reported personality traits have actor as well as partner effects on relationship satisfaction is not only theoretically important, but also methodologically. It demonstrates that the effects are substantial and not only an artifact of the common method variance issue (Kenny & Cook, 1999) that refers to the problem that

actor effects based on self-perceived personality traits and partner effects based on partner-perceived personality traits are biased by shared variance between the predictor and outcome variable.

Third, to the best of our knowledge, this is the first study that investigates the *meta-perception* of personality traits in order to predict relationship satisfaction. However, from related studies, it is known that the evaluations of the partner's representation of the own person are important with respect to positive feelings in intimate relationships (Murray, Holmes, MacDonald, & Ellsworth, 1998). Meta-perceptions of personality traits are expected to be relevant with respect to intimate partners. On the one hand, one could assume that the relationship satisfaction of individuals is high when they appraise that their partners see them in a positive light such as being a smart, lovable or dependable person (*actor effect*). On the other hand, an unfavorable meta-perception (e.g., being quarrelsome) might derive from partner criticism and, in turn, be related to the partner's dissatisfaction (*partner effect*). Positive or negative associations between meta-perceptions of personality traits and relationship satisfaction could be based on deviances between the self- and meta-perceptions. For example, Simon's appraisal that Laura sees him as funnier as he sees himself could be related to both Simon's relationship satisfaction *("she thinks, I'm funny"*) as well as Laura's relationship satisfaction *("I really think, he's funny"*). With respect to the latter example, it is assumed that social feedback processes between intimate partners play an important role in order to understand meta-perception personality effects on relationship satisfaction.

The Present Study

This study focuses on associations between three perspectives on personality and relationship satisfaction in order to get a deeper understanding of the dyadic interplay between personality and intimate relationships. Furthermore, the study sought to account for the widespread claim for multi-method assessments of personality. We had three specific

hypotheses. First, we expected that the three perspectives are related, albeit distinct. Second, based on previous findings, we expected that neuroticism, agreeableness, and conscientiousness are associated with relationship satisfaction across all three perspectives on personality on the basis of actor and partner effects. Third, in terms of the partner- and meta-perception, we expected additional substantial associations with extraversion and openness. With respect to the partner-perception, we expected positive associations between both extraversion and openness and relationship satisfaction, especially for partner effects. The two traits are expected to be more salient from an outside perspective and represent personality traits that are assumed to appear as appealing in the eyes of the intimate partner. Extraversion is related to cheerfulness that might contribute to positive interactions between the intimate partners (John & Srivastava, 1999; Lucas & Diener, 2001). Furthermore, openness is associated with intellect that is known to be a desirable characteristic in an intimate partner (Botwin, Buss, Shackelford, 1997). With respect to the meta-perception, we expected that high scores of meta-perceived extraversion and openness are related to an overall feeling of being valued as a likable, smart, and interesting person by the intimate partner. It is suggested that these appraisals are based on positive interpersonal processes between intimate partners that are related to relationship satisfaction of both partners.

A major strength of this study is the inclusion of three different perspectives on personality and two different assessment methods (self- and partner-report). The particular novel contribution is to include the meta-perception of personality, as this is a relatively rarely examined perspective in the context of intimate couples. Furthermore, in contrast to the majority of previous studies, the current study estimated the relationships between the Big Five personality traits and relationship satisfaction at the latent level which is uncontaminated by measurement error.

3.1.2. Methods

Participants and Procedure

Couples were drawn from the first measurement occasion (2010/2011) of the ongoing Swiss longitudinal study "Co-Development in Personality: Longitudinal Approaches to Personality Development in Dyads across the Life Span" (CoDiP) which aims at investigating personality development in close kin and intimate relationships across three family generations. The overall sample consisted of 1050 adults (57.2% women) ranging in age from 12 to 92 years (M = 41.14, SD = 22.36). All participants completed a questionnaire including a variety of measures such as measures of personality, goals, or well-being. For this study, we selected all heterosexual couples from the three generations. We only included couples with relationship duration longer than six months in order to assure that partners know each other for a certain amount of time and are competent to report about the partner's personality. Seventeen couples were excluded because the relationship duration was less than six months or they had disproportionate missings on personality measures. This lead to the current sample of 216 heterosexual dating, cohabiting or married couples. The 432 individuals ranged in age from 16 to 92 years (M = 48.38, SD = 19.65, *Median* = 50.00). There was a broad range in educational attainment. Of the participants, 9.0% reported having a basic education without an official training qualification, 28.8% had an education with training qualification, 39.7% completed a high school education or equivalent, and 21.8% had a university degree. Regarding marital status, 69.0% of the couples were married. The average relationship duration of the couples was 22.50 years (SD = 17.30, *Median* = 21.79). Of the participants, 70.3% had children.

We used multi-level models in order to assess the variance in the study variables that is explained by the levels of the individual (Level 1), the couple (Level 2), and the family (Level 3). The results indicated that the individual level always accounted for more variance

in the personality variables (averaged percentages across the self-, partner- and meta-perception of the Big Five traits: neuroticism = 99.58%; extraversion = 98.81%; openness = 80.07%; agreeableness = 87.14%; conscientiousness = 91.17%) than the couple or the family level. This was not the case with respect to relationship satisfaction, where the couple level explained more variance (55.76%) than the individual level (34.03%). As the amount of explained variance was always small with respect to the family level, we omitted that level in all analyses which appears feasible to reduce the complexity of the models.

Measures

Big Five personality traits. The 45-item Big Five Inventory (BFI; John & Srivastava, 1999) was used to measure the self-perception of personality. The 21-item short version (BFI-K; Rammstedt & John, 2005) was used to assess the partner- and meta-perception of personality. The questionnaires consist of descriptive phrases that are prototypical markers of the Big Five factors of personality. Five-point Likert-type scales with responses ranging from 1 (*disagree strongly*) to 5 (*agree strongly*) were used to indicate how well these descriptive phrases described (1) their own personality (self-perception), (2) the personality of their intimate partner (partner-perception), and (3) the evaluation of how the intimate partner would rate their own personality (meta-perception). Alpha reliability estimates were: .75-.85 (neuroticism); .78-.84 (extraversion); .74-.76 (openness to experience); .65-.70 (agreeableness); and .76-.80 (conscientiousness).

Relationship satisfaction. Relationship satisfaction was assessed with the Relationship Assessment Scale (RAS; Hendrick, 1988; Sander & Böcker, 1993). The RAS is a 7-item self-report instrument that measures global satisfaction with the relationship. The respondents indicated the degree of agreement with each of the items (e.g., *"In general how satisfied are you with your relationship?"*) on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*very much*). The alpha reliability estimate of the RAS was .91.

Statistical Analyses

Our statistical analyses were performed in four steps. First, we analyzed zero-order correlations for women and men. Additionally, to demonstrate convergent validity, we examined mono-trait/hetero-method, hetero-trait/mono-method, and hetero-trait/hetero-method correlations. Second, we tested whether the self-, partner-, and meta-perception of personality represent three distinct personality constructs. To do so, we compared three-factor models as well as two-factor models with single-factor models by means of confirmatory factor analyses (CFA) to demonstrate that it is worthwhile to examine the three perspectives separately. The measurement model based on either two (partner- and meta-perception) or three parcels (self-perception) as factor indicators which were built according to the item-to-construct balance technique (Little, Cunningham, Shahar, & Widaman, 2002).

Third, we examined the incremental validity of the three perspectives with respect to the prediction of relationship satisfaction by means of two approaches. We conducted a series of hierarchical regressions based on the total sample (i.e., without partner effects). Furthermore, in order to account for the dyadic structure of our data, we adapted the procedure suggested by Cundiff et al. (2012). Using an Actor-Partner Interdependence Model (APIM; Kenny et al., 2006) approach, we conducted three different models for each Big Five trait. The first model only included the self-perception of the couples' personalities as predictors (actor and partner effects) for relationship satisfaction. The second models added the actor and partner effects of the partner-perception, while the third models combined all three perspectives (including the actor and partner effects of the meta-perception). Similarly to Cundiff et al. (2012), we used two indicators of incremental validity. On the one hand, we examined differences in model fits by means of the nested χ^2-difference-tests ($\Delta\chi^2$). On the other hand, we analyzed the increments in the outcome variance R^2. As in our main analyses, we set the actor and partner effects equal across women and men (see below).

Fourth, for our main analyses, we examined the associations between the three personality perspectives and relationship satisfaction by means of latent APIMs, in which we simultaneously tested actor and partner effects for the two members of the dyad, respectively women and men within the intimate couple. Figure 3 shows the conceptual model.

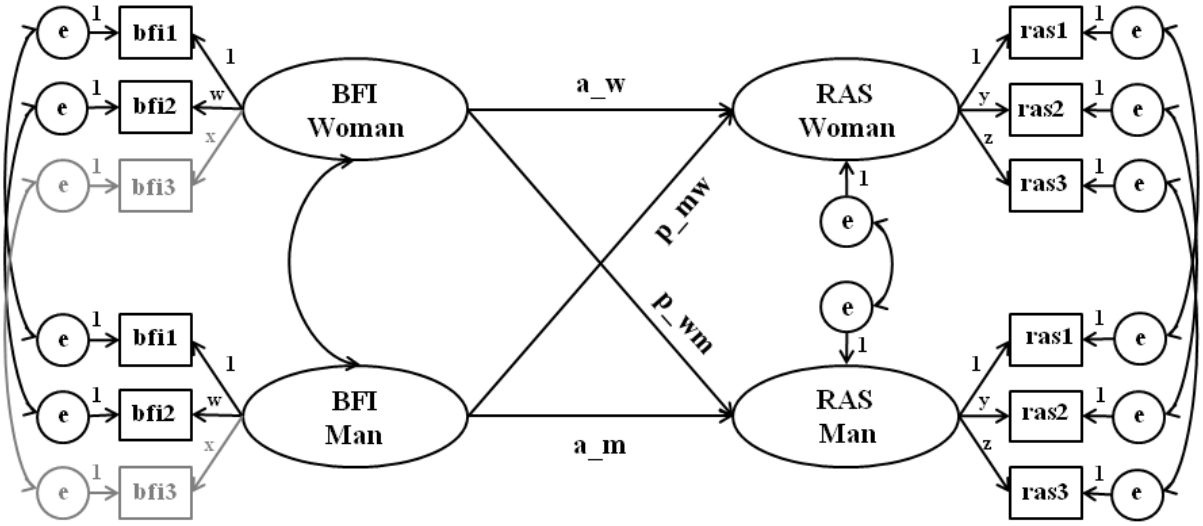

Figure 3. *Cross-Sectional Latent Actor-Partner Interdependence Model*
Notes. BFI = Big Five Inventory; RAS = Relationship Assessment Scale.

The measurement models of the Big Five traits were equally to those described above. In order to establish the latent relationship satisfaction, we used three parcels as factor indicators which were also built according to the item-to-construct balance technique (Little et al., 2002). With respect to the current analyses, actor effects (a_w = actor effects women, a_m = actor effects men) represent the associations between an individual's personality and her or his relationship satisfaction, whereas partner effects (p_mw = partner effects of men on women, p_wm = partner effects of women on men) capture the associations between the individual's personality and the partner's relationship satisfaction. We established separate APIMs for the three perspectives of personality perceptions and across all Big Five traits.

Factor loadings were set to be equal across gender and we allowed for correlated uniqueness for the matching parcels between women and men.

We included age and relationship duration as control variables in all APIMs, because previous research demonstrated age differences in personality traits (e.g., Allemand, Zimprich, & Hendriks, 2008; Roberts, Walton, & Viechtbauer, 2006), as well as effects of relationship duration on relationship satisfaction (Karney & Bradbury, 1995). Because age of women, age of men, and relationship duration were highly correlated in this study (between .91 and .99), we built a composite measure. The variables were *z*-standardized before they were averaged. For each model, we tested whether the actor and partner effects were equal across gender (a_w = a_m and p_mw = p_wm). For that purpose, we compared two models by means of nested χ^2-difference-tests ($\Delta\chi^2$). In the first model, we freely estimated the actor and partner effects for both women and men. In the second model, we set the actor and partner effects for women and men to be equal. The two models did not differ in model fit. For reasons of parsimony, we then constrained actor- and partner-paths to be equal for women and men in all subsequent APIMs.

The analyses were conducted using AMOS (Arbuckle, 2007) and applying maximum likelihood estimation. Model fit was evaluated using the χ^2-exact fit test and two additional fit indexes: the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). In general, CFI values above .95 and RMSEA values below .06 are typically to indicate that a model is adequately parameterized and reflects a good fit, although values above .90 and below .08 respectively, are acceptable (Browne & Cudeck, 1993; Hu & Bentler, 1999). Cohen's *d* was used as measure of mean differences (Cohen, 1988).

Table 7a. *Correlations and Descriptive Statistics among the Study Variables*

	N sp	E sp	O sp	A sp	C sp	N pp	E pp	O pp	A pp	C pp	N mp	E mp	O mp	A mp	C mp	RS
N sp	-	**-.36**	-.13	**-.40**	**-.32**	**.48**	**-.23**	-.04	**-.22**	-.07	**.71**	**-.28**	-.13	**-.34**	**-.22**	-.05
E sp	**-.25**	-	**.32**	.04	**.33**	***-.14***	**.63**	.09	-.07	.11	**-.29**	**.74**	**.23**	.12	**.36**	.03
O sp	-.01	**.36**	-	.06	.12	.07	**.23**	**.41**	**-.22**	.04	.03	**.18**	**.72**	-.00	.10	-.12
A sp	**-.32**	.11	.06	-	**.24**	***-.15***	.05	.11	**.46**	.05	**-.23**	.08	***.16***	**.64**	.10	***.16***
C sp	**-.21**	**.22**	***.16***	***.16***	-	-.13	.11	-.03	.10	**.33**	**-.19**	.11	**.19**	**.21**	**.67**	***.16***
N pp	**.54**	**-.18**	.07	**-.24**	-.00	-	**-.27**	***-.17***	**-.40**	**-.22**	**.50**	-.08	.09	***-.15***	-.09	-.10
E pp	-.04	**.54**	***.14***	.10	.01	**-.19**	-	**.27**	.12	**.23**	***-.17***	**.55**	**.21**	.09	***.14***	.12
O pp	.07	.08	**.49**	.09	.09	-.02	**.32**	-	.08	**.25**	-.01	.06	**.41**	.00	-.02	**.21**
A pp	**-.20**	.12	.00	**.44**	-.05	**-.44**	**.29**	***.17***	-	**.25**	**-.27**	.05	-.03	**.47**	.08	**.23**
C pp	-.02	.07	.06	.08	**.50**	-.11	**.26**	**.34**	**.18**	-	-.06	.05	.09	.07	**.43**	**.26**
N mp	**.68**	**-.23**	.07	**-.20**	**-.19**	**.55**	-.08	.09	**-.25**	-.04	-	**-.22**	-.03	**-.30**	-.10	-.06
E mp	-.06	**.77**	**.25**	.09	.04	***-.15***	**.61**	.13	**.20**	***.17***	***-.15***	-	**.20**	**.21**	**.23**	.09
O mp	.02	**.29**	**.74**	.10	**.19**	.07	***.14***	**.57**	.04	**.21**	.09	**.31**	-	.10	***.17***	-.01
A mp	**-.28**	**.29**	.09	**.64**	***.14***	**-.20**	**.23**	.05	**.44**	.07	**-.33**	**.31**	.13	-	**.20**	**.27**
C mp	-.09	**.23**	***.16***	.05	**.69**	.03	.08	**.19**	-.07	**.59**	-.13	**.18**	**.28**	***.14***	-	**.23**
RS	***-.17***	.09	.02	***.17***	**.20**	***-.16***	***.17***	**.25**	**.19**	**.31**	**-.25**	**.20**	***.19***	***.17***	**.30**	-

Notes. N = 216 women and 216 men; N = Neuroticism; E = Extraversion; O = Openness; A = Agreeableness; C = Conscientiousness; RS = Relationship Satisfaction; sp = self-perception; pp = partner-perception; mp = meta-perception; correlations for women above the diagonal; correlations for men below the diagonal; correlations in boldface are significant at $\alpha = .05$ (in italics) or .01; correlations in dark grey= mono-trait-hetero-method; correlations in light grey = hetero-trait-mono-method; remaining correlations = hetero-trait-hetero-method correlations.

Table 7b. *Correlations and Descriptive Statistics among the Study Variables*

	N sp	E sp	O sp	A sp	C sp	N pp	E pp	O pp	A pp	C pp	N mp	E mp	O mp	A mp	C mp	RS
M ♀	2.93	3.74	3.65	3.89	4.03	2.98	3.83	3.98	3.49	4.26	3.19	3.80	3.93	3.50	4.06	4.23
SD ♀	.76	.70	.54	.48	.59	.82	.78	.65	.79	.61	.83	.81	.64	.81	.67	.66
M ♂	2.44	3.54	3.67	3.78	3.96	2.51	3.46	3.69	3.50	4.03	2.60	3.41	3.70	3.49	3.86	4.31
SD ♂	.64	.66	.58	.48	.58	.86	.91	.78	.81	.80	.78	.84	.73	.79	.76	.58
d	**.70**	**.29**	-.04	***.23***	.12	**.56**	**.44**	**.40**	-.01	**.32**	**.73**	**.47**	**.34**	.01	**.28**	-.13
α ♀	.85	.85	.75	.70	.79	.77	.77	.74	.67	.82	.73	.79	.71	.70	.73	.92
α ♂	.80	.83	.78	.70	.81	.78	.78	.73	.69	.68	.69	.79	.76	.60	.79	.90

Notes. N = 216 women and 216 men; N = Neuroticism; E = Extraversion; O = Openness; A = Agreeableness; C = Conscientiousness; RS = Relationship Satisfaction; sp = self-perception; pp = partner-perception; mp = meta-perception.

3.1.3. Results

Table 7 shows the zero-order correlations (Table 7a) and the descriptive statistics (Table 7b) among the study variables separately for women and men. Gender differences were found with respect to neuroticism and extraversion across all three perspectives. In general, women were more neurotic (*d* range: .56-.73) and extraverted (*d* range: .29-.47) than men. With respect to the other traits, there were mixed results for gender differences depending on the perspective one consider (Table 7). Women showed higher scores with regard to openness and conscientiousness but only for the partner- and meta-perception (openness: *d* range: .34-.40; conscientiousness: *d* range: .28-.32). Finally, based on the self-perception, women had higher agreeableness scores than men (*d* = .23). No gender differences were found for relationship satisfaction.

Interrelations between the Three Perspectives

The self-, partner-, and meta-perception of the respective Big Five traits were substantially interrelated (Table 7). Using the Fisher's *r*-to-*z* transformation approach, we calculated the average agreement between the self- and partner-perception, (women: $r = .47$, men: $r = .50$, p's < .01), between the partner- and meta-perception (women: $r = .48$, men: $r = .56$, p's < .01), and between the self- and meta-perception (women: $r = .70$, men: $r = .71$, p's < .01). In order to provide evidence for convergent validity, we tested whether the average mono-trait-hetero-method correlation (women: $r = .56$, men: $r = .60$, p's < .01) was statistically different from the average hetero-trait/mono-method correlation (women: $r = .22$, men: $r = .21$, p's < .05) and the hetero-trait/hetero-method correlation (women: $r = .13$, men: $r = .12$, p's > .05). This was the case with respect to the average hetero-trait/mono-method correlation (women: $z = 4.22$, men: $z = 4.33$; p's < .001) and with respect to the hetero-trait/hetero-method correlation (women: $z = 5.18$, men: $z = 5.29$; p's < .001).

Distinction of the Three Perspectives

The results of the χ^2-tests (see Appendices A1-A5) clearly indicated that the three-factor models described the data better than the two-factor models (range $\Delta\chi^2$ = 12.617-161.032, Δdf = 2, *p*'s < .01) and the single-factor models (range $\Delta\chi^2$ = 117.886-177.010, Δdf = 3, *p's* < .001). In addition, the model fits of the two-factor models were significantly better than the single-factor models based on the self- and partner-perception (range $\Delta\chi^2$ = 99.321-157.532, Δdf = 1, *p* < .001), the self-meta-perception (range $\Delta\chi^2$ = 13.233-31.387, Δdf = 1, *p*'s < .001), as well as the partner- and meta-perception (range $\Delta\chi^2$ = 67.200-116.844, Δdf = 1, *p* < .001). Thus, with respect to the three perspectives on personality, the results suggest that three-factor models are more suitable than the two- or one-factor models.

With respect to the hierarchical regression analyses, we controlled for gender, age, and relationship duration in the first step of each analysis (R^2 = .04, $F(3, 426) = 6.05$, *p* < .001). The inclusion of the self-perception in the second step did add significant variance in the prediction of relationship satisfaction for the traits neuroticism, agreeableness, and conscientiousness (Range ΔR^2 = .01-.04; *p's* < .05-.001). In contrast to neuroticism, the addition of the partner- (third step) and meta-perception (fourth step) resulted in a significant increase of variance for the traits extraversion, openness, agreeableness, and conscientiousness (partner-perception: range ΔR^2 = .02-.08, *p's* < .05-.001; meta-perception: range ΔR^2 = .01-02; *p's* < .05-.01). We also tested, whether the addition of the meta-perception next to the self-perception explained significantly more variance in the prediction of relationship satisfaction. This was the case for the traits extraversion, openness, agreeableness, and conscientiousness (ΔR^2 = .02-.04, *p's* < .01-.001).

The results for the incremental validity by means of the APIM approach are depicted in Table 8. All model fits were acceptable across the different models. Although the different models fit the data equally well, it occurred that the inclusion of the partner-perception (range

of increments in R^2: .09-.26) over the self-perception as well as the meta-perception (range of increments in R^2: .00-.03) over the other two perspectives generally resulted in an increase of explained variance with respect to relationship satisfaction.

We also tested the increments in R^2 based on models without the addition of the partner-perception in order to find evidence that the meta-perception explains variance in relationship satisfaction above and beyond the self-perception. The models of extraversion, openness, agreeableness, and conscientiousness that combined the self- and the meta-perception did equally fit the data in comparison to the models that only included the self-perception. The neuroticism model simultaneously analyzing the self- and partner-perception model had a worse model fit than the self-perception model ($\Delta df = 2$, $\Delta\chi^2 = 6.510$, $p < .05$) which replicates the results of the hierarchical regression. In general, the inclusion of the meta-perception was related to an increase in R^2 (range of increments in R^2: .03-.07). In summary, the results of both approaches of the incremental validity analyses indicate that all three perspectives explain unique variance with respect to relationship satisfaction.

Table 8. *Model Fits and Results from Incremental Validity Analyses*

		Model fit				Model comparison		R^2		Increment in R^2	
	Model	χ^2	*df*	CFI	RMSEA	$\Delta\chi^2$	Δdf	RS ♀	RS ♂	RS ♀	RS ♂
Neuroticism	sp	1.474	2	1.000	.000			.03	.03		
	sp, pp	1.908	4	1.000	.000	.434	2	.12	.14	.09	.11
	sp, pp, mp	7.720	6	.997	.037	5.812	2	.13	.15	.01	.01
Extraversion	sp	.556	2	1.000	.000			.01	.01		
	sp, pp	2.013	4	1.000	.000	1.457	2	.14	.13	.13	.12
	sp, pp, mp	2.757	6	1.000	.000	.744	2	.17	.16	.03	.03
Openness	sp	3.397	2	.991	.057			.02	.02		
	sp, pp	3.655	4	1.000	.000	.258	2	.25	.28	.23	.26
	sp, pp, mp	4.396	6	1.000	.000	.741	2	.25	.29	.00	.01
Agreeableness	sp	.294	2	1.000	.000			.05	.06		
	sp, pp	3.330	4	1.000	.000	3.036	2	.16	.18	.11	.12
	sp, pp, mp	6.252	6	1.000	.014	2.922	2	.17	.19	.01	.01
Conscientiousness	sp	1.048	2	1.000	.000			.04	.04		
	sp, pp	1.696	4	1.000	.000	.648	2	.25	.27	.21	.23
	sp, pp, mp	2.481	6	1.000	.000	.785	2	.25	.29	.00	.02

Notes. N = 216 women and 216 men; sp = self-perception; pp = partner-perception; mp = meta-perception.

Associations between Personality and Relationship Satisfaction

The zero-order correlations between personality traits and relationship satisfaction are depicted in Table 7. Although the separate results were somewhat mixed for women and men, the general picture shows consistently with previous research that neuroticism is negatively and agreeableness and conscientiousness are positively related to relationship satisfaction. In contrast to the correlations for the self-perception, there are significant positive correlations between the partner- and meta-perception of extraversion and openness and relationship satisfaction primarily in men.

To examine these associations more precisely and to account for the non-independence in dyadic data, we estimated APIMs and we modeled the associations on the latent level (Figure 3). The models fits of the APIMs were acceptable across all three perspectives *(self-perception* models: range χ^2 = 74.502-122.444, *df* = 56, *p*'s < .06, range CFI = .954-.988, range RMSEA = .043-.074; *partner-perception* models: range χ^2 = 51.322-78.083, range *df* = 35-36, *p*'s < .05, range CFI = .969-988, range RMSEA = .047-.076; *meta-perception* models: range χ^2 = 48.573-87.912, range *df* = 35-36, *p*'s < .07, range CFI = .962-.990, range RMSEA = .042-.082) (see Appendix 6 for the complete results). The results of the APIM analyses are shown in Table 9.

Table 9. *Standardized Coefficients Predicting Relationship Satisfaction Based on Personality Self-, Partner-, and Meta-Perceptions*

		Actor effects on relationship satisfaction		Partner effects on relationship satisfaction	
		a_w	a_m	p_mw	p_wm
Neuroticism	Self-perception	-.12*	-.12*	-.07	-.10
	Partner-perception	-.17***	-.21***	-.36***	-.38***
	Meta-perception	-.16**	-.17**	-.19***	-.22***
Extraversion	Self-perception	.07	.08	.03	.04
	Partner-perception	.18***	.22***	.33***	.32***
	Meta-perception	.18**	.21**	.17**	.18**
Openness	Self-perception	-.03	-.03	-.10*	-.11*
	Partner-perception	.16***	.21***	.34***	.32***
	Meta-perception	.08	.11	.02	.02
Agreeableness	Self-perception	.18**	.20**	.15**	.18**
	Partner-perception	.21***	.25***	.38***	.41***
	Meta-perception	.28***	.26***	.18***	.25***
Conscientiousness	Self-perception	.21***	.24***	.00	.00
	Partner-perception	.28***	.46***	.44***	.35***
	Meta-perception	.27***	.34***	.10	.10

Notes. N = 216 couples; actor effects (a_w and a_m) and partner effects (p_mw and p_wm) were set to be equal across gender; *p < .05; **p < .01; ***p < .001.

With respect to the self-perceived personality traits, we found significant negative actor effects for neuroticism, and positive actor effects for agreeableness, and conscientiousness on relationship satisfaction. Positive partner effects were only found with respect to agreeableness and negative partner effects were shown for openness. In contrast, the associations between the partner-perception of personality traits and relationship satisfaction were found across all Big Five traits and consistently both regarding actor and partner effects. The results for the associations between the personality traits from the meta-perception and relationship satisfaction showed significant actor and partner associations for the traits neuroticism, extraversion, and agreeableness. In addition, there was a significant actor effect for the trait conscientiousness. No effects were found for the meta-perception of openness on relationship satisfaction. The results suggest similar, but also different associations between the three personality perspectives and relationship satisfaction. For instance, extraversion had positive actor and partner effects on relationship satisfaction based on the partner- and meta-perception. This pattern was not found for the self-perception.

3.1.4. Discussion

In the field of personality research, there is a widespread consensus that the assessment of personality should be approached by the implementation of multiple methods. This seems particularly relevant for studies focusing on personality effects on indicators of intimate relationships. This current cross-sectional study therefore examined associations between the Big Five personality traits and relationship satisfaction of intimate couples by using three different personality perspectives: the self-, partner-, and meta-perception. To the best of our knowledge, this is the first study that integrated the perspective of the meta-perception of personality traits in the context of intimate relationships.

Our analyses provided three main findings. First, the results based on different methodological approaches (i.e., convergent and incremental validity analyses, confirmatory

factor analyses) indicated that the self-, partner-, and meta-perception represent three related, albeit distinct personality perspectives. Second, the analyses based on all three perspectives revealed significant associations between neuroticism, agreeableness, and conscientiousness, and relationship satisfaction. Third, in addition, the partner- and meta-perceived extraversion was positively related to relationship satisfaction, whereas openness had positive associations with relationship satisfaction based on the partner-perception. We discuss each of these main findings in greater detail below.

Consistent with previous research, self-reported neuroticism, agreeableness, and conscientiousness were significantly associated with relationship satisfaction within the individuals (actor effects) (Dyrenforth et al., 2010; Heller et al., 2004). Partner effects were only evident in terms of agreeableness and openness. Interestingly, with respect to the analyses based on the partner-perception, all Big Five traits were meaningfully associated with relationship satisfaction both via actor and partner effects. Likewise, the results demonstrated that except for openness all remaining meta-perceived traits contribute to relationship satisfaction, conscientiousness was only related to relationship satisfaction via actor effects, though. These results imply that in addition to the three consistent correlates of relationship satisfaction (i.e., neuroticism, agreeableness, and conscientiousness), extraversion and openness play relevant roles for relationship satisfaction when accounting for the partner- and meta-perception, as two personality perspectives that involve the specific context of intimate relationships.

It is assumed and supported by the incremental validity analyses that every perspective sheds light on some specific aspects of personality which seems to impact differences in intra- and inter-personal outcomes such as relationship satisfaction. For example, the self-perception perspective may represent enduring aspects of the self that is composed by mental representations and generalizations about oneself including personal memories and

aggregated experiences (cf. Hart & Matsuba, 2012). Thus, self-perception ratings may be less based on recent interactions in social contexts. As an example, the self-perceived neuroticism might be rather related to the neurotic part of one's identity than to the neuroticism that is expressed in specific interactions within the intimate relationship. This would, in turn, explain why the partner effect based on the self-perception of neuroticism did not turn out to be significant in contrast to the partner- and meta-perceptions of neuroticism that probably directly affect the intimate partner.

On the contrary, the self-perceptions of the Big Five traits might be more influenced by a crystallized self-bias that describes the blindness of individuals towards changes in their basic personality traits (McCrae & Weiss, 2007). Thus, back to our example, it might be that Simon used to be a person that is generally not interested in arts. So, Simon thinks that he is not very open in this domain (self-perception). However, Laura's fascination for painting and design made a big impression on him. It happened that Simon started to overtake Laura's habit to go and see the latest exhibitions in town. Hence, from Laura's perspective (partner-perception), Simon is open towards arts and aesthetics and that is something she really likes about him. To cut to the chase, this example might explain why the self-perception and partner-perception of the same trait could result in different associations with relationship satisfaction, as it is the case for openness in our study.

Besides, the partner-perception might be more influenced by aspects of personality that are salient and observable in social interactions of the intimate couple. For example, Vazire (2010) suggested that extraversion should be adequately reported from an outside perspective because of its high observability. In the context of intimate couples, it is possible that partner ratings might be affected by relationship quality. It has been shown that individuals tend to make positive and idealistic attributions about their partner's personality under the condition of high relationship satisfaction (Fletcher & Kerr, 2010; Murray et al., 1996a; 1996b). The

overestimation of positive traits with respect to individuals who are liked by the rater is known as the halo effect (Berman & Kenny, 1976). However, as the associations between the partner-rated personality traits and the partner's relationship satisfaction were not extremely high, the existence of a strong halo effect does not seem likely.

We suggest that the meta-perception might function as a bridge between the self- and partner-perception and, in turn, might include reflections of oneself in the context of the intimate relationship and particularly in the eyes of the intimate partner, that are not activated within the process of generating self-perceptions. It is therefore assumed that the use of the meta-perception leads to a more complex understanding of the interactions between personality and intimate relationships, as it incorporates the feelings of how one's person is valued by the intimate partner. The latter points to the looking glass phenomenon that is closely related to the concept of self-esteem (Leary & Baumeister, 2000) which, in turn, has been shown to be relevant for attachment and felt security in intimate relationships (Murray et al., 1998; Murray, Holmes, & Griffin, 2000).

The consistent associations between neuroticism, agreeableness, conscientiousness and relationship satisfaction can be interpreted with respect to the maturity concept. Hogan and Roberts (2004) proposed that these three traits are characteristic of a mature personality. There is also evidence that maturity is related to interpersonal sensitivity, self-control, and the fulfillment of socially important roles (Wood & Roberts, 2006) which, in turn, might positively influence intimate relationships. Hogan and Roberts (2004) assumed that maturity includes both an inside (related to self-perception) and an outside (related to partner-perception) aspect. Accordingly, the first aspect is reflected in individuals' adjustment (emotional stability) and role taking ability (agreeableness and conscientiousness) and the second aspect is represented in the reputation of being emotionally stable, agreeable, and conscientious. Hogan and Roberts (2004) suggested that the inside and outside aspects of

maturity predominantly overlap but also can differ from each other, as it was shown in our results. The present results also might reflect the fact that highly emotionally stable, agreeable, and conscientious individuals are more willing to invest in and to commit to their intimate relationships and thus maintain a good relationship with their partners (Lodi-Smith & Roberts, 2007; Roberts & Wood, 2006).

Previous work based on self-reports demonstrated that the associations between extraversion and openness and relationship satisfaction are unclear. The current results clearly contribute to a better understanding of the role of these traits for relationship satisfaction particularly regarding extraversion. In terms of extraversion, we found that the partner- and meta-perception were substantially and positively related to relationship satisfaction both with respect to actor and partner effects. Extraversion comprises several underlying facets that are particularly expressed in social interactions and are therefore well observable from an outside view. Extraverts are known to be talkative and energetic (John & Srivastava, 1999) and have the ability to maintain a positive affect balance (Lischetzke & Eid, 2006). Thus, extraverts feature characteristics that are assumed to be relevant and positive for social interactions. Therefore, it is suggested that the perception of those characteristics, both via partner- as well as meta-perceptions has meaningful effects on relationship satisfaction of both partners. Thus, Simon's humorous and cheerful personality is probably easier to identify from another person's perspective (e.g., Laura's perspective) than for Simon self, because particularly social interactions (e.g., during leisure time with Laura) evoke that facets of personality. Furthermore, it is the explicit view of Laura that has something to do with her relationship satisfaction and that of Simon's, because Laura's pleasure might function as feedback for Simon which, in turn, will be represented in Simon's meta-perceptions about him to be humorous and cheerful.

Limitations, Implications, and Future Research

Despite the strengths of this study, it also exhibits some limitations. First, one could speculate that the individual's partner-perception (*How do I see my partner?*) and meta-perception (*How do I think my partner sees me?*) are confounded with relationship satisfaction. That is, positive evaluations of these questions go systematically along with high relationship satisfaction. However, the two perceptions are only modestly interrelated. Therefore, it is not likely that the partner effects of the partner-perception and the actor effect of the meta-perceptions on relationship satisfaction are driven by unspecific-shared variance. Second, while personality was assessed by multiple perspectives, only self-reports of relationship satisfaction were available in this study. For future studies, it would be relevant to use different methods and forms of report to assess a broader picture of relationship satisfaction. Third, it is not possible to draw conclusions about the direction of effects given the cross-sectional nature of the study. Thus, longitudinal studies are needed.

The findings of the current study have several implications. First, on the one hand our results have shown that the self-, partner-, and meta-perception of the Big Five personality traits are substantially related. This finding needs to be emphasized with respect to the overlap between the self- and partner-perception as these two perspectives are based on different sources of report (self- and other-report). On the other hand, we provided evidence that three perspectives are distinct and show different association patterns with relationship satisfaction. The latter finding is especially relevant with respect to the self- and meta-perception in reference to the ongoing debate about whether the meta-perception really constitutes something distinct from the self-perception or whether it is result of a self-verification process (Carlson et al., 2011; Kenny & DePaulo, 1993; Swann, 2012). Our findings support the assumption that individuals have the ability to acquire self-knowledge about their reputation in the social environment that deviates from their self-perception. The

result that the three perspectives are distinct might provoke the question about the most accurate personality perspective. However, we suggest that there is not one ideal approach to capture personality. Rather, we think that every perspective has its power and the most precise personality assessment can be reached by the implementation of various perspectives. Second, our findings provided novel findings with respect to the association between extraversion and relationship satisfaction that, to date, is unclear in the literature. Our results imply that extraversion contributes to relationship satisfaction when perceiving it from the outside perspective, directly via the partner-perception or indirectly via the meta-perception. Thus, studies of personality effects on relationship satisfaction that are only based on the self-perception of individuals are limited. Third, we have to point to the differences with respect to the occurrence of actor and partner effects based on the three perspectives. While personality traits based on self-perceptions were primarily linked to relationship satisfaction via actor effects, we found both actor and partner effects of personality on relationship satisfaction based on partner- and meta-perceptions of personality. With respect to the partner-perception, the many substantial actor effects need to be accented, whereas the significant partner effects based on the meta-perception have to be underlined, as those effects are not inflated by common method variance (Kenny & Cook, 1999).

Our current study provides implications for future research. First, from a developmental perspective, it would be of great interest to investigate longitudinal trajectories of the three perspectives to explain stability and change of personality in the specific context of intimate relationships. Moreover, it would be interesting to study whether the relation between the different perspectives changes as a function of age or whether the three perspectives have the same associations with relationship satisfaction in various age groups. Second, the three perspectives in the context of intimate couples raise additional interesting research questions with respect to similarity and congruence. Previous research on personality similarity (e.g.,

are partners with similar personality profiles happier in their relationship?) was mostly based on personality self-perceptions. Similarity analyses on the partner- and meta-perceptions might help to better understand the role of personality similarity in intimate relationships. The three perceptions provided by both partners of an intimate relationship allow for analyzing congruence phenomena from a dyadic perspective (e.g., is a high meta-accuracy representing a high overlap between partner- and meta-perceptions positively related to the relationship satisfaction of intimate partners?). For instance, one could assume that when Laura sees Simon as more neurotic and less agreeable and conscientious (partner-perception) than Simon sees himself (self-perception) her relationship satisfaction is rather low. Third, future studies should investigate moderators and mediators with respect to the associations between the three different perspectives and relationship satisfaction in order to understand the underlying mechanisms and contextual factors that drive these associations. With reference to the looking glass theory (Leary & Baumeister, 2000), one could speculate that meta-perceptions and self-esteem are two interrelated constructs that are both uniquely and jointly relevant for relationship satisfaction.

Finally, the results also have practical implications. As the findings of our analyses provided evidence for incremental validity of the self-, partner-, and meta-perception of personality, the three perspectives could be useful for diagnostic purposes in the context of intimate relationships. Furthermore, with respect to couple counseling, it might be insightful for intimate partners to share their inside and outside personality perspectives and their meta-perceptions with respect to each other. In this vein, individuals can find out more about themselves, about how they are perceived in their relationship, and about their accurate or inaccurate assumptions about how they are seen by their partner. This reflection could lead to a fruitful identity building process both with respect to the individual as well as the couple

which, in turn, could result in increased self-esteem and self-satisfaction of the individual as well as enhanced feelings of intimacy and attachment of the partners.

Conclusions

The findings of the current study lead to several conclusions. We demonstrated that the self-, partner-, and meta-perception of the Big Five traits represent three related, albeit distinct personality perspectives. Furthermore, our results imply that the three perspectives might differ with respect to associations with important outcomes of social relationships such as relationship satisfaction. Therein, it needs to be emphasized that a dyadic perspective on that interplay is indicated. From our findings, it is suggested that individuals have accurate knowledge about how they are seen by others such as the intimate partner as in our study. Thus, we conclude that the meta-perception is more than a copy of the self-perception.

3.2. Study 3: Discrepancies between Personality Perceptions and Their Dyadic Associations with Relationship Satisfaction[3]

3.2.1. Introduction

Simon sees his girlfriend Laura as less neurotic (partner-perception) than Laura sees herself (self-perception). In turn, Laura thinks that Simon sees her as less agreeable and conscientious (meta-perception) than Simon actually sees her (partner-perception). Have a guess; is Simon happy in his relationship? How do discrepancies between personality perceptions contribute to intimate couples' relationship satisfaction? This question refers to the scope of the current study.

Based on previous research, it is suggested that different perceptions of personality such as the self-, other-, and meta-perception contain both shared as well as unique proportions in the description of individuals' personalities (Carlson, Vazire, & Furr, 2011; Vazire, 2006; Vazire & Carlson, 2010; Schaffhuser, Allemand, & Martin, in press). One line of research focuses on the question whether discrepancies in self- and other-perceptions contribute to individuals' well-being such as to relationship satisfaction of intimate couples (e.g., Luo & Snider, 2009; Murray et al., 1996a; 1996b). The meta-perception of personality traits plays a minor role in the context of discrepancies between personality perceptions as well as with respect to associations between perception discrepancies and relationship satisfaction of intimate couples.

The current study aimed at investigating personality discrepancies between the self- and partner-perception as well as between the partner- and meta-perception of neuroticism, agreeableness, and conscientiousness and their dyadic associations with relationship satisfaction. Therein, we applied the Latent Congruence Model by adapting it to the dyadic structure of the current data (LCM; Cheung, 2009a; 2009b).

[3] A similar version of this chapter is in preparation for submission (Schaffhuser, Allemand, Werner, & Martin)

Personality Perceptions: Relatedness and Distinction

Personality traits represent relatively stable differences in emotions, cognitions, and behaviors that distinguish individuals from one another (Costa & McCrae, 1992; John & Srivastava, 1999). As personality traits have inside (i.e., thinking and feeling) and outside aspects (i.e., acting, reacting), they can be assessed by both self-perceptions (self-report) and other-perceptions (other-report). The self-perception covers the individual's intra-psychic representation of the self (i.e., identity; Hogan & Roberts, 2004; Roberts & Wood, 2006), whereas the other-perception represents an outside perspective of an individuals' personality (i.e., reputation; Back et al, 2011; Hogan & Roberts, 2004). Comprising a specific form of the other-perception, we focus on the partner-perception (partner-report) in the current study. A third perspective on personality that is rarely used in the personality literature corresponds to the meta-perception of personality. The meta-perception can be defined as an individual's evaluation about how she or he is seen by others or by a specific other person as the intimate partner (Carlson & Kenny, 2012; Laing, Phillipson, & Lee, 1966). Thus, the meta-perception represents appraisals about one's own reputation (Back et al., 2011; Hogan & Roberts, 2004).

The literature on associations between the self-, other-, and meta-perceptions suggests that although different personality perceptions are substantially related to each other, every perspective exhibits distinct aspects of personality (Back & Vazire, 2012; Carlson et al., 2011; Schaffhuser et al., in press; Vazire & Carlson, 2010). In the context of intimate couples, Schaffhuser et al. (in press) demonstrated that the self-, partner-, and meta-perception of the Big Five personality traits explain incremental validity in terms of relationship satisfaction both on the intra- and inter-individual level (i.e., actor and partner effects; Kenny, Kashy, & Cook, 2006). As the overlaps between the self- and other-perception and the other- and meta-perception are usually lower than the overlap between self- and meta-perception (Carlson et al., 2011; Kenny, 1994; Kenny & DePaulo, 1993;

Vazire & Carlson, 2010; Watson, Hubbard, & Wiese, 2000b), we focus on discrepancies with respect to the first two cases in the current study.

It is not clear so far, whether discrepancies between self- and partner-perceptions or partner- and meta-perceptions are systematic. So, do individuals see themselves on average higher or lower in their self- or meta-perceptions as compared to the partner-perceptions? From related literature, it is known that individuals have a tendency to see themselves in a more positive light than they see others (cf. Alicke & Sedikides, 2009). Whether this tendency is reflected in higher self-perceptions of positively connoted traits (e.g., agreeableness and conscientiousness) or lower self-perceptions of negatively connoted traits (e.g., neuroticism) in relation to partner- or meta-perceptions is not known so far.

Discrepancy between Personality Perceptions and Relationship Satisfaction

It has been debated for a long time whether realistic or enhanced self-views are more beneficial for the individual's well-being also specifically in the context of intimate couples (Swann, 1983; Taylor & Brown, 1988). Theoretical assumptions and empirical evidence are mixed.

The self-verification theory (Swann, 1983) postulates that individuals have a general desire for coherence implying that a high overlap between self- and other-perceptions has positive consequences for individuals' well-being (Swann, Rentfrow, & Guinn, 2002). According to Swann et al. (2002), intimate relationships have an important function in soothing the need for self-verification. Therein, one assumes that partner-perceptions and partner behavior that confirm the self-perception of the individual (i.e., partner-verification; Rusbult, Finkel, & Kumashiro, 2009) have favorable outcomes. Indeed, Swann, De La Ronde, and Hixon (1994) reported that partner-verification was related to increased well-being in married couples (but not in dating couples though).Another line of research postulates that self-enhancement (Srivastava, 2012), thus overestimation of one's positive characteristics is related to

psychological adjustment (e.g., Dufner et al., 2012, Taylor & Sherman, 2008). However, in the context of intimate relationships and with respect to relationship satisfaction, there is the general assumption that the partner's overestimation of one's positive characteristics (i.e., partner-enhancement; Rusbult et al., 2009) is related to positive relationship outcomes (Barelds & Dijkstra, 2011; Busby, Holman, & Niehuis, 2009; Luo & Snider, 2009; Murray et al., 1996a; 1996b; Miller, Niehuis, & Huston, 2006) .

Thus, in reference to this, it might be assumed that associations between personality perception discrepancies and relationship satisfaction vary as a function of how beneficial the respective personality trait is for intimate relationships. Previous research suggests that particularly three of the Big Five traits substantially contribute to relationship satisfaction. Multiple studies provided evidence that low neuroticism and high agreeableness and conscientiousness are intra- and inter-individually related to high relationship satisfaction (e.g., Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Karney & Bradbury, 1995; Malouff, Thorsteinsson, Schutte, Bhullar, & Rooke; Neyer & Voigt, 2004). Thus, derived from the findings with respect to partner-enhancement and associations between the Big Five traits and relationship satisfaction, it might be assumed that discrepancies in terms of higher neuroticism self-perceptions compared to partner-perceptions and lower agreeableness and conscientiousness self-perceptions compared to partner-perceptions are positively related to relationship satisfaction.

To the best of our knowledge, the role of meta-perceptions in perception discrepancy associations with relationship satisfaction is unknown. However, one might speculate that individuals who see their partners in an even more flattering way (partner-perception) than the partner would expect (meta-perception) are likely to be happy in their relationship with that person.

The LCM: An Alternative Way of Assessing Personality Discrepancies

Discrepancy research is confronted by methodological challenges. The most used methods for assessing discrepancies refer to difference scores or profile similarity indices although the two approaches have been widely criticized due to their low reliability (Cheung, 2009b; Edwards, 1994; 2001; 2009). For instance, difference scores can be biased by the partner's individual scores when it is not controlled for the main effects in the analyses (cf. Furler, Gomez, & Grob, 2013).

An alternative method to assess discrepancy relates to the Latent Congruence Model (LCM; Cheung, 2009b) which is based on structural equation modeling. Briefly, the LCM consists of two latent factors; the latent level and congruence factor. The level factor represents the average value of a construct that is based on two investigated sources such as on two perceptions of personality as in the present study. The congruence factor includes the difference in rating between the sources (i.e., difference between two personality perceptions). Therefore, we use the terminology *discrepancy* instead of congruence as originally introduced by Cheung (2009b).

In comparison to difference and profile similarity scores, the LCM exhibits several advantages. First, the discrepancy factor is modeled on a latent basis, thus establishing estimates that are free from measurement errors. Second, by means of the latent discrepancy mean, information about systematic differences between the two sources (i.e., between self- and partner- and partner- and meta-perception) is given. Third, by means of the latent discrepancy variance, inter-individual differences in discrepancies can be assessed that, in turn, can be further investigated (predictors and outcomes of inter-individual differences?). Fourth, the associations between the latent discrepancy level and outcome variables such as relationship satisfaction in the current study are controlled for the main effects of personality level.

The Present Study

The present study focuses on latent discrepancies between the self- and partner-perception as well as between the partner- and meta-perception of neuroticism, agreeableness, and conscientiousness and their dyadic associations with relationship satisfaction. We focused on neuroticism, agreeableness, and conscientiousness as these three traits have consistently been reported to be associated with relationship satisfaction (e.g., Dyrenforth et al., 2010; Malouff et al., 2010; Karney & Bradbury, 1995). Our main analyses were based on a dyadic adaptation of the Latent Congruence (LCM; Cheung, 2009b).

We investigated three hypotheses. First, with respect to the level of personality perceptions, we assumed negative actor and partner effects of neuroticism and positive actor and partner effects of agreeableness and conscientiousness on relationship satisfaction both in terms of the self-partner-perception level and the partner-meta-perception level. Second, with respect to the latent discrepancy mean, we expected that the individuals' self-perceptions were more positive than the partner-perceptions suggesting lower neuroticism and higher agreeableness and conscientiousness self-perceptions in comparison to partner-perceptions. Third, we expected that beyond personality levels perception discrepancies that involve more flattering and favorable partner-perceptions in relation to self- and meta-perceptions are positively related to both intimate partners' relationship satisfaction (i.e., actor and partner effects).

3.2.2. Methods

Couples were drawn from the first measurement occasions of the ongoing Swiss longitudinal study "Co-Development in Personality: Longitudinal Approaches to Personality Development in Dyads across the Life Span" (CoDiP) which aims at investigating personality development in close kin and intimate relationships across three family generations. Participants were recruited in the German speaking part of Switzerland. The

overall sample at T1 consisted of 1050 adults (age: *M* = 41.14, *SD* = 22.36; 57% women). All participants completed a questionnaire including a variety of measures such as measures of personality, goals, or well-being.

For this study, we selected all heterosexual couples with complete data for both partners with respect to the variables of interest. We only included couples with relationship duration longer than 6 months in order to assure that spouses know each other for a certain amount of time and are competent to report about the partner's personality. Seventeen couples were excluded because the relationship duration was less than six months or they had disproportionate missings on personality measures. This lead to a final sample of 216 heterosexual dating, cohabiting or married couples. The 432 individuals ranged in age from 16 to 92 years (*M* = 48.38, *SD* = 19.65). There was a broad range in educational attainment. Of the participants, 9.0% reported having a basic education without an official training qualification, 28.8% had an education with training qualification, 39.7% completed a high school education or equivalent, and 21.8% completed a university degree. Regarding marital status, 69.0% of the couples were married. The average relationship duration of the couples was 22.50 years (*SD* = 17.30). Of the participants, 70.3% had children.

Measures

Big Five personality traits. The self-perception of personality traits was assessed with the 45-item Big Five Inventory (BFI; John & Srivastava, 1999). The 21-item Big Five Inventory (BFI-K; Rammstedt & John, 2005) was used to assess the partner- and meta-perception. For reasons of comparability between the three perspectives, we only used the items of the longer BFI version that are equivalent to the BFI-K. Five-point Likert-type scales with responses ranging from 1 (*disagree strongly*) to 5 (*agree strongly*) were used to indicate how well these descriptive phrases described (1) their own personality (self-perception; sp), (2) the personality of their intimate partner (partner-perception; pp), and (3) the evaluation of

how the intimate partner would rate their own personality (meta-perception; mp). Alpha reliability estimates for neuroticism were: .76 (sp), .79 (pp), .75 (mp); for agreeableness: .59 (sp), .68 (pp), .65 (mp); for conscientiousness: .64 (sp), .77 (pp), .76 (mp). The alpha reliabilities were not as high as desired. However, the estimates are comparable with those reported by Rammstedt and John (2005; neuroticism: .74-.77; agreeableness: .59-.64; conscientiousness: .65-.70).

Relationship satisfaction. Relationship satisfaction was assessed with the Relationship Assessment Scale (RAS; Hendrick, 1988; Sander & Böcker, 1993). The RAS is a 7-item self-report instrument that measures global satisfaction with the relationship. The respondents indicated the degree of agreement with each of the items (e.g., "In general how satisfied are you with your relationship?") on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*very much*). The alpha reliability estimate of the RAS was .91.

Statistical Analyses

We adapted the Latent Congruence Model (LCM; Cheung, 2009b) for dyadic data. For both intimate partners, thus women and men, we established LCMs based on the self- and partner-perception (*Model 1*), and the partner- and meta-perception (*Model 2)* (lower part of Figure 4). The models were separately established for neuroticism, agreeableness, and conscientiousness.

Modeling procedure. We modeled the LCM on a second-order basis. First, we modeled latent self-, partner-, and meta-perception factors by means of two parcels consisting of two items. In order to establish measurement invariance, the factor loadings and intercepts were set to be equal across gender. Then, we used the latent self- and partner-perceptions (*Model 1*) and partner- and meta-perceptions (*Model 2*) as indicators for the latent LCM level and discrepancy factors of neuroticism, agreeableness, and conscientiousness. As described by Cheung (2009b), the LCM level is defined as the mean rating of the two indicators. The

loadings of the level indicators (Y1, Y2) were fixed to 1. The discrepancy factor covers the rating difference between the two respective personality perceptions. The loadings of the first indicators (Y1) were fixed to -0.5 and the loadings of the second indicators (Y2) were fixed to +0.5. By adapting the definition of Cheung (2009b), the level and discrepancy factors of *Model 1* and *2* can be expressed as follows:

Model 1:

$$\text{Level} = \frac{\text{Self-perception [Y1]+ Partner-perception [Y2]}}{2}$$

$$\text{Discrepancy} = \text{Partner-perception [Y2]} - \text{Self-perception [Y1]}$$

Model 2:

$$\text{Level} = \frac{\text{Partner-perception [Y1]+ Meta-perception [Y2]}}{2}$$

$$\text{Discrepancy} = \text{Meta-perception [Y2]} - \text{Partner-perception [Y1]}$$

The level and discrepancy factors provide four units of information that are of main interest. First, the *LCM level mean* indicates the average level of the respective personality construct (e.g., what is the average level of neuroticism of women and men?). Second, the *LCM level variance* determines whether there are inter-individual differences with respect to the personality constructs (e.g., are there women and men who are substantially higher or lower on agreeableness?). Third, the *LCM discrepancy mean* indicates whether the underlying indicators systematically differ from each other (e.g., is the self-perception of conscientiousness on average higher than the partner-perception?). Fourth, the *LCM discrepancy variance* shows whether there are inter-individual differences across couples' discrepancies (e.g., are there some couples with higher discrepancy scores in comparison to other couples?).

Associations between level, discrepancy, and relationship satisfaction. With respect to our main analyses, we added relationship satisfaction of both intimate partners as manifest

outcome variables of the LCM factors of women and men. The models including relationship satisfaction (see Figure 4) contain four actor effects and four partner effects. The actor effects refer to effects of perception level (a1w, a1m) and perception discrepancy (a2w, a2m) on relationship satisfaction within women and men. The partner effects refer to effects of women's perception level (p1w, p1m) and perception discrepancy (p2w, p2m) on men's relationship satisfaction and vice versa (Kenny et al., 2006).

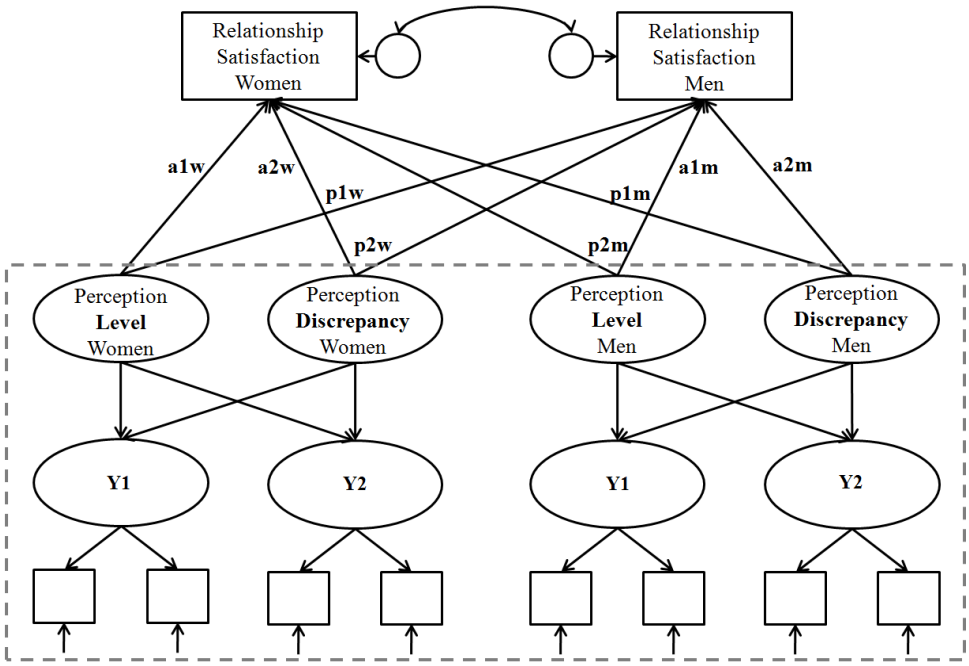

Figure 4. *Latent Congruence Model: Level and Discrepancy as Predictors for Relationship Satisfaction*

For each model, we tested whether the actor and partner effects were equal across gender.

For that purpose, we used a stepwise procedure and compared the models using nested χ^2-tests. As a first step, we tested whether an unconstrained model and a model with constrained actor effects between perception level and relationship satisfaction (a1w = a1m) across gender significantly differed in model fit. In case that the models did not differ, we used the constrained model for further comparisons. In further steps, we continued that

procedure and tested whether constraining the remaining actor effect (step 2: a2w = a2m) and two partner effects (step 3: p1w = p1m; step 4: p2w = p2m) worsened the model fits in relation to the less constrained model. Except for the partner-meta-perception model of neuroticism[4], we constrained all actor and partner paths to be equal across women and men.

Control variables. In addition, we included age and relationship satisfaction as control variables, because previous research demonstrated age differences in the Big Five personality traits (Allemand, Zimprich, & Hendriks, 2008), as well as effects of relationship duration on relationship satisfaction (Karney & Bradbury, 1995). Because ages of women and men, and relationship duration were highly correlated in this study (range r = .91-.99, p < .001), we built a composite measure. The variables were *z*-standardized before they were averaged.

The analyses were conducted using AMOS (Arbuckle, 2007) and applying maximum likelihood estimation. Model fit was evaluated using the χ^2 exact fit test and two additional fit indexes: the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). In general, CFI values above .95 and RMSEA values below .06 are typically to indicate that a model is adequately parameterized and reflects a good fit, although values above .90 and below .08 respectively, are acceptable (Browne & Cudeck, 1993; Hu & Bentler, 1999). Cohen's *d* was used as a measure of mean differences (Cohen, 1988).

[4] Due to estimation problems with respect to the partner-meta-perception model of neuroticism, it was not possible to perform all model comparisons with respect to gender equality across the regression paths. Therefore, we allowed the actor effects of the discrepancy factor on relationship satisfaction (a2w, a2m) to be unconstrained across women and men. However, the results demonstrated that both effects were small and non-significant (see Table 12).

Table 10. *Descriptive Statistics and Correlations among the Study Variables*

	1	2	3	4	5	6	7	8	9	10
1. N sp	-	-.30***	-.27***	.47***	-.19**	-.09	.72***	-.27***	-.23***	-.05
2. A sp	-.20**	-	.13*	-.13	.48***	.06	-.24***	.67***	.06	.12
3. C sp	-.24***	.15*	-	-.12	.02	.33***	-.16*	.15*	.69***	.19**
4. N pp	.46***	-.23**	-.04	-	-.40***	-.22***	.50***	-.15*	-.09	-.10
5. A pp	-.10	.34***	-.03	-.44***	-	.25***	-.27***	.47***	.08	.23**
6. C pp	-.06	.09	.53***	-.11	.18**	-	-.06	.07	.43***	.26***
7. N mp	.65***	-.17*	-.17*	.55***	-.25***	-.04	-	-.30***	-.10	-.06
8. A mp	-.24***	.67***	.11	-.20**	.44***	.07	-.33***	-	.20**	.27***
9. C mp	-.15*	.11	.71***	.03	-.07	.59***	-.13	.14*	-	.23***
10. RS	-.14*	.05	.18**	-.16*	.19**	.31***	-.25***	.17*	.30***	-
M Women	3.01	3.40	4.11	2.98	3.49	4.26	3.19	3.34	4.06	4.23
SD Women	.84	.73	.60	.82	.79	.61	.83	.83	.67	.66
M Men	2.44	3.32	4.00	2.51	3.50	4.03	2.60	3.30	3.86	4.31
SD Men	.74	.70	.61	.86	.81	.80	.78	.72	.76	.58
d	.72	.11	.18	.56	.01	.32	.73	.05	.28	.13

Notes. N = 216 women (correlations above the diagonal) and 216 men (correlations below the diagonal); N = neuroticism, A = agreeableness, C = conscientiousness, sp = self-perception, pp = partner-perception, mp = meta-perception, RS = relationship satisfaction; *p < .05; **p < .01; ***p < .001.

3.2.3. Results

The descriptive statistics and zero-order correlations among the study variables are separately shown for women and men in Table 10. Gender comparisons across all three perspectives demonstrated that women were more neurotic (range d = .56-.73) and slightly more conscientious (range d = .18-.51) than men. No gender differences were found for agreeableness and relationship satisfaction.

Means and Variances of the Level and Discrepancy Factors

The model fits across all LCM models were acceptable (self-partner-perception models: range χ^2 = 22.112 (p = .227) - 32.183 (p = .021), df = 18; range CFI = .975-.990; range RMSEA = .033-.061; partner-meta-perception models: range χ^2 = 21.535 (p = .253) – 40.925 (p = .002), df = 18; range CFI = .960-.993, range RMSEA = .030-.077). The means and variances of the level and discrepancy factors are presented in Table 11.

The latent means suggest that women tend to be generally higher with respect to the latent levels of neuroticism, agreeableness, and conscientiousness. The significant variances across all latent levels suggest inter-individual differences in neuroticism, agreeableness, and conscientiousness across both models either using the self- and partner-perceptions or the partner- and meta-perceptions as level indicators.

With respect to the means of the latent discrepancy factors, we did not find significant average discrepancies between the self- and partner-perceptions and the partner- and meta-perceptions either for women or for men. However, the significant variances of the latent discrepancy factors indicate that there is a broad variability with respect to discrepancies between self- and partner-perceptions and partner- and meta-perceptions across intimate couples.

Table 11. *Means and Variances of the Latent Level and Discrepancy Factors*

		Means				Variances			
		Level		Discrepancy		Level		Discrepancy	
		Women	Men	Women	Men	Women	Men	Women	Men
Neuroticism	Self-Partner	3.12	2.60	-.31	-.21	.42***	.36***	.44***	.37***
	Partner-Meta	2.96	2.45	.06	-.05	.38***	.39***	.35***	.26***
Agreeableness	Self-Partner	3.72	3.67	.25	.33	.39***	.33***	.33***	.48***
	Partner-Meta	3.60	3.57	-.50	-.54	.44***	.36***	.44***	.38***
Conscientiousness	Self-Partner	2.91	2.76	.17	.06	.13***	.24***	.17***	.21***
	Partner-Meta	3.18	2.98	-.49	-.45	.18***	.33***	.17***	.23***

Notes. N = 216 couples; *p < .05; ***p < .001.

Perception Level and Relationship Satisfaction

The model fits based on the models comprising associations between perception level and discrepancy and relationship satisfaction were acceptable, too (self-partner-perception models; range χ^2 = 45.013 (p = .098) – 57.669 (p = .007), df = 34; range CFI = .973-.986, range RMSEA = .039-.057; partner-meta-perception models: range χ^2 = 50.107 (p = .037) – 58.456 (p = .006), range df = 33-34, range CFI = .971-.978, range RMSEA = .047-.058). The regression coefficients with respect to the associations between level and discrepancy of neuroticism, agreeableness, and conscientiousness and relationship satisfaction are shown in Table 12.

Table 12. *Standardized Regression Coefficients Predicting Relationship Satisfaction from the Level and Discrepancy Factors*

		Level effects				Discrepancy effects			
		Actor effects		Partner effects		Actor effects		Partner effects	
Predictor	Model	W	M	W → M	M → W	W	M	W → M	M → W
Neuroticism	Self-Partner	-.18***	-.19***	-.28***	-.23***	-.15*	-.16*	-.36***	-.30***
	Partner-Meta	-.19***	-.22***	-.31***	-.27***	.10	.05	.23**	.17**
Agreeableness	Self-Partner	.16**	.17**	.28***	.23***	.14*	.20*	.31***	.36***
	Partner-Meta	.24***	.24***	.36***	.29***	-.03	-.03	-.21*	-.18*
Conscientiousness	Self-Partner	.20***	.30***	.05	.06	.47**	.54**	.78***	.70***
	Partner-Meta	.29***	.45***	.22***	.26***	-.21*	-.25*	-.51***	-.48***

Notes. N = 216 couples; W = Women, M = Men; *p < .05; **p < .01; ***p < .001.

Low levels of neuroticism and high levels of agreeableness and conscientiousness had substantial actor effect on relationship satisfaction with respect to both the self- and partner-perception model *(Model 1*) and the partner-meta-perception model (*Model 2*). Except for the self-partner-perception level of conscientiousness, all remaining levels had significant partner effects on relationship satisfaction. Thus, in general, neurotic individuals and their partners were less satisfied in their relationships, whereas agreeable and conscientious individuals and their partners had high scores on relationship satisfaction.

Perception Discrepancy and Relationship Satisfaction

The interpretation of associations between personality discrepancy and relationship satisfaction is not trivial as the discrepancy is not defined as usual (e.g., difference scores) in terms that higher scores imply more difference (Edwards, 2009). By contrast, high scores in discrepancy could mean that the Y1 (*Model 1*: self-perception; *Model 2*: partner-perception) and Y2 (*Model 1*: partner-perception; *Model 2*: meta-perception) are becoming closer together or further apart, depending on the relative magnitudes of Y1 and Y2 (Edwards, 2009, pp. 36-37). We go back to our virtual couple Laura and Simon in order to exemplify how the regression coefficients in Table 12 are interpretable (see also Figure 5).

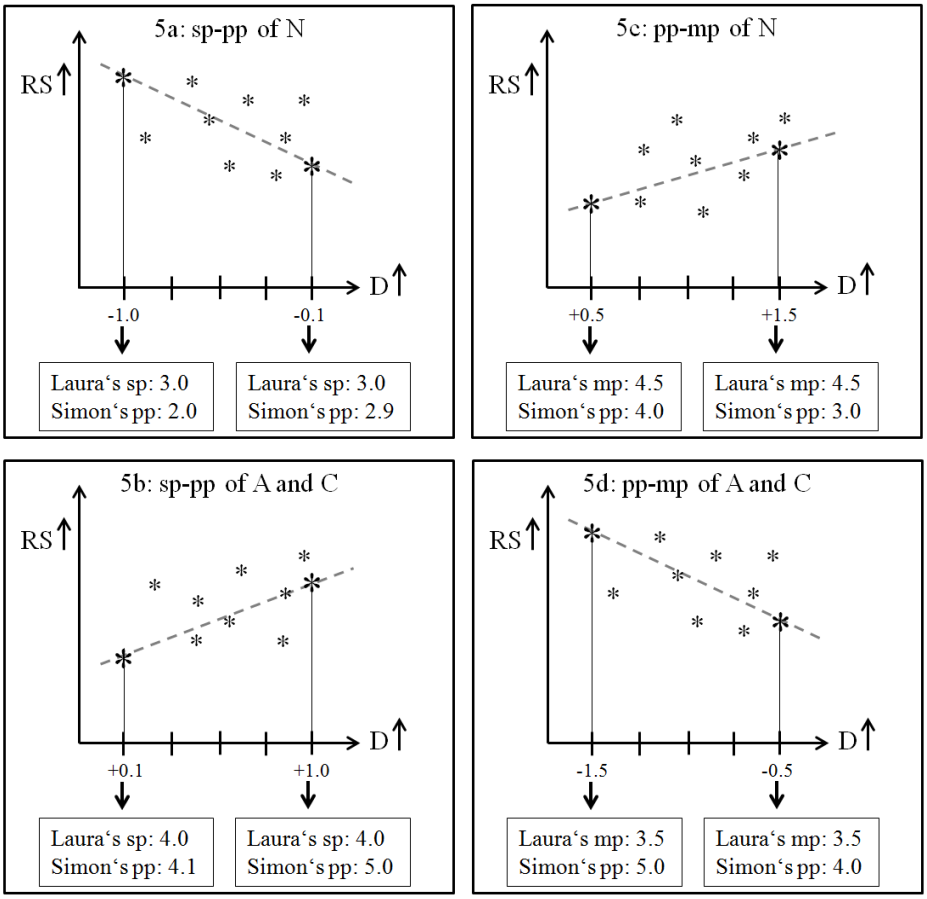

Figure 5. *Discrepancies between Laura's and Simon's Self-, Partner-, and Meta-Perceptions and Associations with Relationship Satisfaction*
Notes. sp = self-perception; pp = partner-perception; mp = meta-perception; D = discrepancy; RS = relationship satisfaction; N = neuroticism; A = agreeableness; C = conscientiousness.

Self-Partner-Perception Discrepancy

Neuroticism (N). With respect to the discrepancy between the self- and partner-perception of neuroticism, we found negative actor and partner effects on relationship satisfaction which can be interpreted as follows (see Figure 5a): Assume that Simon sees Laura as less neurotic than she sees herself. As the discrepancy score is computed as partner-perception minus self-perception, this results in a negative score which would be in line with the slightly negative mean of the neuroticism discrepancy factor across all couples (although, in general, the interpretation is independent from the mean of the discrepancy factor).

If we take *Laura's self-perception* on her neuroticism *as given* (e.g., N = 3.0), it would be flattering to be regarded as a lot less neurotic by her partner Simon compared to how Laura sees herself (e.g., if Simon rates her as N = 2.0, resulting in a discrepancy score of -1.0). By contrast, it would be less flattering for her if Simon regards her almost as neurotic as she sees herself (e.g., if Simon rates her as N = 2.9, resulting in a discrepancy of -0.1).

Thus, taking the self-perception as given, the more negative (lower) the discrepancy score, the more flattering the rating, potentially enhancing relationship satisfaction of both intimate partners (actor effect: perceived person, partner effect: perceiver of the person). By contrast, the less negative (higher) the discrepancy score, the less flattering the rating would be, potentially decreasing relationship satisfaction of both intimate partners (actor and partner effects).

Agreeableness (A) and conscientiousness (C). With respect to the discrepancy between the self- and partner-perception of agreeableness and conscientious, we found positive actor and partner effects on relationship satisfaction associations which can be interpreted as follows (see Figure 5b): Assume that Simon sees Laura as more agreeable and conscientious than she sees herself resulting in a positive discrepancy score (i.e., partner-perception minus self-perception).

If we take *Laura's self-perception* on her agreeableness and conscientiousness *as given* (e.g., A and C = 4.0), it would be flattering to be regarded as a lot more agreeable and conscientious by Simon compared to how Laura sees herself (e.g., if Simon rates her as 5.0 on agreeableness and conscientiousness, resulting in a discrepancy score of +1.0). By contrast, it would be less flattering for her if Simons regards her as almost as agreeable and conscientious she sees herself (e.g., if Simon rates her as A and C = 4.1, resulting in a discrepancy of +0.1).

Thus, by taking Laura's self-perception as given, the more positive (higher) the discrepancy score, the more flattering the rating, potentially enhancing relationship satisfaction of both intimate partners (actor and partner effects). In turn, the less positive (lower) the discrepancy score, the less flattering the rating would be, potentially decreasing relationship satisfaction of both intimate partners (actor and partner effects).

Partner-Meta-Perception Discrepancy

Neuroticism (N). With respect to the discrepancy between the partner- and meta-perception of neuroticism, we found positive actor and partner effects on relationship satisfaction associations which can be interpreted as follows (see Figure 5c): Assume that Simon sees Laura as less neurotic (partner-perception) than she expects (meta-perception) resulting in a positive discrepancy score (meta-perception minus partner-perception).

If we take *Laura's meta-perception* with respect to Simons' perception on her neuroticism *as given* (e.g., N = 4.5), it would reflect a more positive view on Laura if Simon sees her actually as much less neurotic than she expects (e.g., N = 3.0, resulting in a discrepancy score of +1.5) as compared to an almost equal evaluation (e.g., N = 4.0, resulting in a discrepancy score of +0.5).

Thus, by taking Laura's meta-perception as given, the more positive (higher) the discrepancy score, the more flattering Simon's rating, potentially enhancing relationship satisfaction of both intimate partners (i.e., actor and partner effects). In contrast, the less positive (lower) the discrepancy score, the less flattering the rating would be, potentially decreasing relationship satisfaction of both intimate partners (i.e., actor and partner effects).

Agreeableness (A) and conscientiousness (C). With respect to the discrepancy between the partner- and meta-perception of agreeableness, we found negative partner effects whereas we found both negative actor and partner effects with respect to conscientiousness which can be interpreted as follows (see Figure 5d): Assume that Simon sees Laura as more agreeable

and conscientiousness (partner-perception) than she expects (meta-perception) resulting in a negative discrepancy score (meta-perception minus partner-perception).

If we take Laura's *meta-perception* with respect to Simon's perception on her agreeableness and conscientiousness *as given* (e.g., A and C = 3.5), it would reflect a more positive view on Laura if Simon sees her actually as much more agreeable and conscientious than the expects (e.g., A and C = 5.0, resulting in a discrepancy score of -1.5) as compared to an almost equal evaluation (e.g., A and C = 4.0, resulting in a discrepancy score of -.05).

Thus, by taking Laura's meta-perception as given, the more negative (lower) the discrepancy score, the more flattering Simon's rating, potentially enhancing relationship satisfaction of the intimate partners (actor effects for A and C, partner effect for C). The less negative (higher) the discrepancy score, the less flattering Simon's rating, potentially decreasing relationship satisfaction of both intimate partners.

3.2.4. Discussion

The present study investigated level and discrepancy of self-, partner-, and meta-perceptions of the personality traits neuroticism, agreeableness, and conscientiousness and their dyadic associations with relationship satisfaction. In comparison to previous studies on personality perception discrepancies, the present study added the following two aspects: First, we included the meta-perception as a further relevant personality perception and focused next to self-partner-perception discrepancies on partner-meta-perception discrepancies. Second, by means of the LCM (Cheung, 2009b), we applied a relatively novel methodological approach for assessing discrepancy based on structural equation modeling.

Three main findings can be summarized. First, based on the non-significant means of the latent perception levels, it is suggested that there are no systematic differences between self- and partner-perceptions as well as partner- and meta-perceptions of neuroticism, agreeableness, and conscientiousness. Second, we found both actor and partner effects of low

neuroticism level and high agreeableness and conscientiousness level on relationship satisfaction. Third, while controlling for the main effects of personality level on relationship satisfaction, our results indicated intra- and inter-individual associations between personality perception discrepancy of neuroticism, agreeableness, and conscientiousness and relationship satisfaction. With respect to the latter, it was shown that flattering and favorable partner-perceptions in relation to self- and meta-perceptions contribute to relationship satisfaction of both intimate partners.

Personality Perception Level and Relationship Satisfaction

In replicating previous research, our analyses demonstrated negative effects of neuroticism level and positive effects of agreeableness and conscientiousness level on relationship satisfaction. Neurotic individuals are known to have more negative thoughts and feelings and to experience more interpersonal difficulties as compared to emotionally stable individuals (Finn, Mitte, & Neyer, 2013; Hampson, 2012). The first aspect comprising intra-psychic characteristics of neurotics (thoughts and feelings) might explain intra-individual associations (i.e., actor effects) between neuroticism and low relationship satisfaction, whereas the second aspect relating to social interactions (interpersonal difficulties) might be more strongly related to inter-individual associations (i.e., partner effects). Agreeable individuals are known to be warm, helpful, and cooperative, and they generally show constructive behavior in conflict situations (Jensen-Campbell & Graziano, 2001; John & Srivastava, 1999). Thus, agreeable individuals exhibit a wide array of behavior that might promote high quality in relationships which, in turn, might be likewise beneficial for both intimate partners (i.e., actor and partner effects). Conscientious individuals are known to be good at controlling their impulses and they are task- and goal-directed. Previous studies have provided empirical evidence suggesting that conscientiousness has meaningful intra- and inter-individual associations with relationship satisfaction (e.g., Dyrenforth et al., 2010).

From our findings, it remains unclear why the partner effect between conscientiousness and relationship satisfaction was only evidenced with respect to the partner- and meta-perception level of conscientiousness. However, one might speculate that the portion of conscientiousness that is advantageous for the intimate partner is more precisely captured by means of the partner- and meta-perceptions of conscientiousness that can be seen as two forms of outside perspectives on personality traits (Schaffhuser et al., in press).

Personality Perception Discrepancy and Relationship Satisfaction

Over and above personality perception level, our results demonstrated that the discrepancies between personality perceptions explain additional variance in terms of relationship satisfaction.

With respect to the self-partner-perception discrepancy, we found substantial actor and partner effects across all three traits. In general, we found that the relationship satisfaction of couples tends to be high when intimate partners see each other through rose-colored glasses. With respect to actor effects, relationship satisfaction of individuals is enhanced when their partners see them in a more favorable light (partner-perception) than they see themselves (self-perception). With respect to partner effects, relationship satisfaction is high when individuals rate their partners in a flattering way in relation to the self-perception of the partner. In this vein, our findings go along with previous evidence by authors suggesting that having an overly positive personality view of the partner (i.e., partner-enhancement) is beneficial for relationships (e.g., Barelds & Dijkstra, 2011; Murray et al., 1996a, 1996b).

Moreover, in our study we demonstrated that the positive effect of partner-enhancement (Rusbult et al., 2009) did not only occur with respect to discrepancies between the self- and partner-perception but also with respect to discrepancies between partner- and meta-perceptions. With reference to the latter, it is interesting that the positive effect was primarily accentuated in terms of partner effects. Thus, a positive view of the partner above and beyond

the partner's meta-perception of being seen in a positive light seems to be particularly relevant for high relationship satisfaction.

One limitation of the current study refers to the cross-sectional data basis of our study which does not allow it to draw causal conclusions about the direction of effects. It is feasible that not only level and discrepancy influence relationship satisfaction but also vice versa. Thus, it is possible that high relationship satisfaction is a predictor for discrepancies between personality perceptions.

Implications

The current study has several implications. First, the current findings demonstrated the importance of including the meta-perception into research on personality perception discrepancies and relationship satisfaction. Second, it needs to be emphasized, that the three personality perceptions did not systematically deviate from each other in terms of significant latent means. This is not in line with empirical findings indicating that the majority of individuals have inflated self-views that is reflected in an overestimation of positive characteristics and underestimation of weaknesses (cf. Alicke & Sedikides, 2009). However, comparing oneself (self-perception: my perspective on myself) with others (other-perception: my perspective *on others*) is conceptually distinct from comparing the self-perception with the other-perception of another person (the perspective of another person *on me*). Furthermore, the self-enhancing tendencies might be more accentuated in other contexts than in the context of intimate relationships. Third, we found substantial variability with respect to the latent discrepancy factor. Why is the perception discrepancy of some couples high, whereas it is low for other couples? For future research, it might be interesting to find predictors. Fourth, the present study demonstrated that the Latent Congruence Model (Cheung, 2009b) might be an appropriate method to study discrepancy phenomena in the context of intimate relationships. With respect to the latter, we demonstrated the opportunity

to adapt the LCM into a dyadic analysis design. Fifth, with respect to future studies, it would be important to investigate discrepancies in a longitudinal design in order to assess the stability of personality perception discrepancies. A further relevant question would refer to the longitudinal predictive value of discrepancies on relationship satisfaction or other important variables. Self-esteem could be one such variable, as self-esteem refers to individuals' self-evaluation that is substantially based on appraisals how other people (e.g., the intimate partner) value oneself as a person (Leary & Baumeister, 2000; Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995) Thus, discrepancies between self- and meta-perceptions or other- and meta-perceptions might be highly relevant with respect to self-esteem.

General Conclusions

The findings from the current study highlight the need for implementing meta-perceptions in personality research and more specific in research on perception discrepancies of intimate couples. Furthermore, our findings demonstrate that personality perception discrepancies contribute to relationship satisfaction over and above levels of personality traits.

4. PERSONALITY DEVELOPMENT IN INTIMATE RELATIONSHIPS

4.1. Study 4: Dyadic Longitudinal Interplay between Personality and Relationship Satisfaction: A Focus on Neuroticism and Self-Esteem[5]

4.1.1. Introduction

Intimate relationships represent one of the most fundamental environmental contexts of the adult life span that shapes the individual's development (Huston, 2000; Lang, Reschke, & Neyer, 2006; Neyer, Mund, Zimmermann, & Wrzus, 2013). Relationship satisfaction can be understood as an indicator of the individuals' satisfaction with that important environmental context. It is also assumed that relationship satisfaction can appear as, either a predictor or outcome with respect to individual differences such as personality traits (cf. Neyer et al., 2013). This idea is based on the theory of dynamic interactionism postulating that interactions between the person and the environment such as personality traits and relationship satisfaction are reciprocal (Caspi, 1998; Neyer & Asendorpf, 2001; Neyer et al., 2013).

Findings of previous research on personality and relationship satisfaction have indicated that personality more strongly influences relationships than vice versa (Asendorpf & Wilpers, 1998; Neyer & Asendorpf, 2001; Parker, Lüdtke, Trautwein, & Roberts, 2012). However, we now assume that the direction of effects might vary according to the nature of the considered personality trait. Therefore, we aim to contrast longitudinal associations between neuroticism and self-esteem with relationship satisfaction as these two traits are related to each other but assumed to have different antecedents and functions (Bosson & Swann, 2009; Widiger, 2009). Neuroticism is known as an important predictor of subsequent relationship dissatisfaction (Karney & Bradbury, 1995; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007), whereas less is known about longitudinal associations between self-esteem

[5] A similar version of this chapter has been submitted for publication at "The Journal of Research in Personality" (Schaffhuser, Wagner, Lüdtke, & Allemand)

and relationship satisfaction. As self-esteem tends to mirror social feedback processes (Leary & Baumeister, 2000), it may be more likely to function as an outcome of relationship satisfaction. However, with respect to both personality traits, longitudinal dyadic designs are still scarce and existing previous findings are inconclusive.

In our study, we moved several steps beyond existing research by examining the dyadic longitudinal interplay between neuroticism and self-esteem and, both individual and shared aspects of relationship satisfaction (i.e., relationship climate) within heterosexual couples over two years. Specifically, using the developmental context of stable, intimate relationships we addressed differential associations of longitudinal within-person (i.e., actor effects) and between-person (i.e., partner effects) effects in the personality-relationship transaction. The use of dyadic longitudinal analysis designs including personality as well as relationship satisfaction of both partners has the advantage that ecologically valid indicators of the individual's environment can be studied. In order to more precisely operationalize the environment, we not only applied the widely used Actor Partner Interdependence Models (Actor-Partner Interdependence Model [APIM]; Kenny, Kashy, & Cook, 2006) but also conducted analyses based on an extended Common Fate Model (Common Fate Model [CFM]; Ledermann & Kenny, 2012). By means of the latter, we modeled the shared relationship satisfaction as relationship climate. The CFM is only rarely used in couples' research although it considers the nature of dyadic variables (e.g., relationship satisfaction) that are expected to have a shared influence (e.g., relationship climate) on both intimate partners (Ledermann & Kenny, 2012).

Transactions between Personality and Intimate Relationships

Personality traits represent relatively enduring characteristics of the self and describe how individuals think, perceive, and feel, and how they act and react in the social world (John & Srivastava, 1999; McCrae & John, 1992). Several theoretical approaches have

attempted to explain the influence of personality traits on social relationships such as intimate relationships (Back et al., 2011). For instance, *inter*-personal models assume that personality effects on relationships are a product of interactions between partners (Karney & Bradbury, 1997), that is, the individual's personality traits are related to specific relationship behavior such as communication that, in turn, impacts the partner's relationship satisfaction (Caughlin, Huston, & Houts, 2000). In contrast, *intra*-personal models assume that personality affects the valence of interpersonal perception (Fisher & McNulty, 2008). This idea is related to the concept of reactive person-environment transactions suggesting that personality shapes the experience in, interpretation of, and reaction to the social environment (Caspi & Roberts, 2001). Moreover, the latter theory of dynamic interactionism (cf. Caspi, 1998) suggests an ongoing or inexorable interaction between personal and environmental characteristics implying a reciprocal relationship (Back et al., 2011; Caspi & Roberts, 2001; Neyer & Asendorpf, 2001). That is, personality has an effect on the environment, such as social relationships, and vice versa.

The majority of previous research has examined personality effects on intimate relationships, whereas less is known about relationship effects on personality. This might be due to the assumption that personality traits are more stable than relationship aspects and that the latter play a minor role in personality development (Neyer et al., 2013). However, empirical evidence emphasizes that although personality traits are relatively stable, they are prone to differential development (Allemand, Zimprich, & Hertzog, 2007; Roberts & DelVecchio, 2000; Trzesniewski, Donnellan, & Robins, 2003; Twenge & Campbell, 2001). Potential factors for explaining personality change often refer to experiences in the social environment such as relationship experiences (Caspi & Roberts, 2001; Neyer et al., 2013; Sturaro, Denissen, van Aken, & Asendorpf, 2008). Previous findings have demonstrated that social interactions feed back into personality development, for instance, by how others

perceive and react towards the self (e.g., Caspi & Roberts, 2001; Denissen, Schönbrodt, van Zalk, Meeus, & van Aken, 2011; Neyer & Lehnart, 2007). Intimate relationships provide an ideal context, therefore, to study the development and interdependency of personality and social environmental characteristics, as they are important source of social feedback.

Origins and Functions of Neuroticism and Self-Esteem

Neuroticism is described as one's tendency to experience negative affect and to exhibit dysfunctional response patterns to environmental stressors (Costa & McCrae, 1992; Widiger, 2009). Self-esteem refers to the global, cognitive evaluation of the self (Leary & Baumeister, 2000; Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995). Although neuroticism and self-esteem are substantially related (Judge, Erez, Bono, & Thoresen, 2005; Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001), they represent two distinct personality traits with different antecedents and functions (Bosson & Swann, 2009; Widiger, 2009). In terms of determinants, theoretical work and genetic studies suggest that neuroticism exhibits a high proportion of genetic variance indicating a substantial biological underpinning (Penke, Denissen, & Miller, 2007; Turkheimer, 2000). On the other hand, empirical evidence indicates that self-esteem is more strongly governed by socio-environmental factors (Leary & Baumeister, 2000; Kendler, Gardner, & Prescott, 1998). Sociometer theory (Baumeister & Leary, 1995) argues that self-esteem reflects the individuals' appraisal with respect to social inclusion and belongingness (Baumeister & Leary, 1995; Bosson & Swann, 2009; Leary, 1999). Accordingly, self-esteem is regarded as a monitor or outcome of interpersonal feedback processes.

Neuroticism and self-esteem also differ with respect to their developmental ontogenesis. Neurotic tendencies in early childhood manifest as anxious and irritable temperament dimensions (Caspi et al., 2003; Caspi, Roberts, & Shiner, 2005; Rothbart, Ahadi, & Evans, 2000). In contrast, the formation of global self-esteem requires complex

cognitive abilities such as self-evaluation, perspective-taking, and social comparison skills that are not acquired until late childhood. Thus, individual differences in global self-esteem exhibit near middle or late childhood (Harter, 2006a; 2006b; Steinberg, 2005).

Neuroticism and self-esteem can also be distinguished with respect to their mechanistic function. From an adaptive perspective, it can be argued that neuroticism consists of emotions that support the individuals' defense against threat and danger and expressions of neuroticism can be seen as an alerting function, for example, signaling others when help and support are needed (cf. Widiger, 2009). Thus, neuroticism might be particularly at work in conveying person-related information (e.g., emotions) into the social environment. In turn, because one important function of self-esteem is assumed to navigate individuals in the social world, it might also be particularly important in person perceptions of information emanating from the social environment (e.g., appreciation) (Leary & Baumeister, 2000).

Interrelatedness of Neuroticism, Self-Esteem, and Relationship Satisfaction

According to the Vulnerability-Stress-Adaption model (VSA) of Karney and Bradbury (1995), personality traits represent enduring vulnerabilities that are defined as stable factors individuals bring to their relationships and that contribute to relationship quality and stability. Neuroticism is a prototypical example of an enduring vulnerability (Karney & Bradbury, 1995) as it is known to evoke maladaptive relationship processes such as increased conflict behavior and higher levels of perceived daily stressors (Hampson, 2012). Low global self-esteem can also be conceptualized as a source of vulnerability for intimate relationships as it is related to increased sensitivity to rejection threat and decreased relationship enhancement processes (Murray, Rose, Bellavia, Holmes, & Kusche, 2002).

Although the VSA model represents a good theoretical starting point in order to explain associations between personality traits and relationship satisfaction, it exhibits incompletions. First, it assumes that personality traits are stable and have a causal effect on relationship

outcomes. Hence, bidirectional associations between personality traits and relationship satisfaction are not postulated. Second, although the VSA accounts for relationship processes, it does not explicitly consider a dyadic perspective and thus omits the differentiation between intra- and inter-personal associations (i.e., actor and partner effects; Kenny et al., 2006). Third, as a consequence the model does not differentiate between individual and dyadic aspects of relationship outcomes. This is an omission, because relationship satisfaction can be conceptualized from an individual and a dyadic perspective. With respect to the latter, we assume that the overlap between the intimate partners' relationship satisfaction represents a part of their shared environmental context that we conceptualize as *relationship climate* in the current study (Ledermann & Kenny, 2012).

Neuroticism and relationship satisfaction. The majority of findings on effects of neuroticism on relationship satisfaction refer to intra-personal (i.e., actor effects) associations. Both cross-sectional as well as longitudinal findings indicate that neuroticism is negatively related to relationship satisfaction and predicts relationship dissolution (Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Karney & Bradbury, 1995; Roberts et al., 2007). Finn, Mitte, and Neyer (2013) found evidence for a relationship-specific interpretation bias of neuroticism suggesting that neurotic individuals tend to evaluate their relationships more negatively.

Inter-personal associations (i.e., partner effects) are studied less often and extant results have been inconsistent. For example, some findings indicate significant associations between individuals' neuroticism and their partners' relationship satisfaction (e.g, Dyrenforth et al., 2010), whereas other studies fail to find evidence for partner effects (Neyer & Voigt, 2004). In addition, studies on effects of relationship satisfaction on neuroticism are scarce. Thus, it remains unclear, whether the interplay between neuroticism and relationship satisfaction is

intra- or and inter-personal (i.e., actor and partner effects) and whether the longitudinal associations are unidirectional or reciprocal.

Self-esteem and relationship satisfaction. Only few studies addressed the associations between self-esteem and relationship satisfaction. However, the role of self-esteem is an important topic in couple research (cf. Crocker & Park, 2004; Murray et al., 2002; Shackelford, 2001).

Cross-sectional studies indicate both positive intra- and inter-personal associations between self-esteem and relationship satisfaction (Barelds, 2005; Erol & Orth, 2013; Murray, Holmes, & Griffin, 2000; Sciangula & Morry, 2009; Robinson & Cameron, 2012; Voss, Markiewicz, & Doyle, 1999). However, longitudinally, the literature is inconsistent with respect to the direction of effects. Orth, Robins, and Widaman (2012) found that self-esteem predicts level as well as change in relationship satisfaction, but there was no evidence for relationship satisfaction effects on self-esteem. In contrast, Denissen, Penke, Schmitt, and van Aken (2008) investigated short-term cross-lagged effects of relationship interaction quality and daily self-esteem fluctuations by means of a diary study. Their results showed that interaction quality with romantic partners was a predictor for self-esteem fluctuations. This finding supports the Sociometer theory: Relationship satisfaction appears to be a source for satisfying the need for belongingness. However, similar to the two reported and most previous studies no dyadic information was available.

In summary, previous research suggests that concurrent associations between neuroticism and relationship satisfaction are negative, whereas self-esteem and relationship satisfaction are positively related to each other. Longitudinal and dyadic findings on bidirectional interplays are scarce and, further, extant results do not show a clear picture about the direction of effects between personality traits and relationship satisfaction, primarily with respect to self-esteem.

The Present Study

The present study examined whether the dyadic longitudinal interplay between personality traits and relationship satisfaction, as well as relationship climate, varies as a function of personality trait. In doing so, we investigated intra- and inter-personal (i.e., actor and partner effects) associations among intimate partners' neuroticism, self-esteem, and relationship satisfaction across two measurement occasions over two years. We employed two types of longitudinal, dyadic cross-lagged models to test our three hypotheses. First, we hypothesized negative actor and partner effects of neuroticism on relationship satisfaction. Second, with reference to the Sociometer theory (Baumeister & Leary, 1995), we hypothesized that relationship satisfaction predicts self-esteem. Third, based on the relationship-specific interpretation bias of neurotic individuals (Finn et al., 2013), we expected that primarily the individual part of relationship satisfaction rather than relationship climate would be affected by neuroticism. In turn, we expected that self-esteem is influenced by both individual relationship satisfaction as well as relationship climate.

The current study extended previous work in several ways. To begin with, we conducted longitudinal dyadic analyses of the interplay between personality traits and relationship satisfaction. Thus, we were able to control for the stability of personality and relationship characteristics while modeling within- and between-person effects. Second, our sample consists of heterosexual couples from a normal adult population, rather than students only. Third, the current study compares the differential longitudinal effects of two different personality traits that are related but conceptually distinct. Fourth, in terms of relationship satisfaction, we distinguished between individual as well as dyadic and shared aspects (i.e., relationship climate).

4.1.2. Methods

Participants and Procedure

Data were drawn from the first two available measurement occasions of the ongoing Swiss longitudinal study "Co-Development in Personality: Longitudinal Approaches to Personality Development in Dyads across the Life Span" (CoDiP) which aims at investigating personality development in immediate family and intimate relationships across three family generations. Participants were recruited in the German speaking part of Switzerland. The overall sample at T1 consisted of 1050 adults (age: M = 41.14, SD = 22.36; 57% women). Parts of the questionnaire of the large-scale survey included items on neuroticism, self-esteem, and relationship satisfaction. The time lag between the two measurement occasions was two years. For this study, we selected all heterosexual couples with complete data for both partners with respect to the variables of interest. The current study sample consisted of 141 heterosexual dating, cohabiting or married couples (N = 282 individuals). The following sample description refers to the first measurement occasion.

The participants ranged in age from 16 to 85 years (M = 50.00, SD = 19.10). There was a broad range in educational attainment. Of all participants, 8% reported having a basic education without an official training qualification, 29% had an education with training qualification, 40% completed a high school education or equivalent, and 22% completed a university degree or equivalent. The average relationship duration of the couples was 23.85 years (SD = 17.02), whereby 72% of the couples were married and 73% of them had children.

Attrition analyses indicated that those couples with complete data had slightly higher relationship satisfaction scores (Cohen's d = .20), but did not significantly differ from the drop-out couples with respect to neuroticism (d = .11) nor self-esteem (d = .04).

Measures

Neuroticism. Neuroticism was measured with a scale from the Big Five Inventory (BFI; John & Srivastava, 1999). The eight items consisted of descriptive phrases that are prototypical markers of neuroticism. Using a five-point Likert-type scale from 1 (*disagree strongly*) to 5 (*agree strongly*), participants indicated how well the descriptive phrases defined their personality. Cronbach's alpha reliability estimates were .84 (T1) and .86 (T2).

Self-esteem. Self-esteem was assessed with the Rosenberg Self-Esteem Scale (RSES; von Collani & Herzberg, 2003; Rosenberg, 1965). The questionnaire included ten items based on a four-point Likert-type scale with responses ranging from 1 (*applies not at all*) to 4 (*applies totally*). Alpha reliability estimates were .86 (T1) and .84 (T2).

Relationship satisfaction. Relationship satisfaction was assessed with the Relationship Assessment Scale (RAS; Hendrick, 1988; Sander & Böcker, 1993). The RAS is a 7-item self-report instrument that measures global relationship satisfaction. The respondents indicated the degree of agreement with each of the items on a five-point Likert-type scale ranging from 1 (*not at all*) to 5 (*very much*). The alpha reliability estimate was .91 at T1 and T2.

Statistical Analyses

Measurement invariance models. A precondition for longitudinal analyses is the presence of measurement invariance (MI; see Meredith, 1993). In addition, regarding the dyadic structure of our data, it is implied to test whether the measurement models hold across the dyad members, thus, women and men in our sample (Kenny et al., 2006). Therefore, we tested both measurement invariance of neuroticism, self-esteem, and relationship satisfaction across the two measurement occasions as well as across women and men. Each latent factor was based on three parcels of manifest indicators built according to the item-to-construct balance technique (Little, Cunningham, Shahar, & Widaman, 2002). In this part of the analyses, we assessed MI across time as follows. In a first step, we compared the weak

invariance models (invariant factor loadings across T1 and T2) against the configural invariant models (no parameter constraints) by means of nested χ^2-difference tests ($\Delta\chi^2$). In the second step, we compared the strong invariance models (plus invariant intercepts across T1 and T2) against the weak invariance models and finally, we tested the strict invariance models (plus invariant error variances) against the strong invariance models. All model comparisons did not show a statistically significant model fit reduction. Thus, strict MI for the three constructs held across the two measurement occasions. In the second part of analyses, we tested MI across women and men. In doing so, we used the strict invariance models across time as baseline model to compare it with separate models for women and men. The models did not statistically differ in χ^2 suggesting that the strict invariance models across time hold for both women and men. We used the final strict invariant model for all subsequent analyses (see Appendix A7 for the results of these MI analyses).

Multilevel models. The present data set consisted of individuals being nested in couples and being nested in family. Multi-level models differentiating between these three levels (i.e., Level 1: individual, Level 2: couple, and Level 3: family) indicated that for both personality traits the individual level accounted for more variance (neuroticism: T1 = 99.43%, T2 = 100.00%; self-esteem: T1 = 83.96%, T2 = 80.04%) than the couple or the family level. However, this was not the case with respect to relationship satisfaction, where the couple level (T1 = 47.92%, T2 = 52.62%) explained more variance than the individual level (T1 = 35.25%, T2 = 32.94%) and family level (T1 = 16.83, T2 = 14.43%). These results have two important implications: First, the amount of explained variance for the family level was always small and, thus, omitting this level in all analyses appears feasible to reduce the complexity of the models. Second, the amount of explained variance on the couple level regarding relationship satisfaction lends support to the idea of an environmental climate that

characterizes the shared perceptions of both partners of the couple (Ledermann & Kenny, 2012).

APIM models. In order to account for the non-independence in dyadic data and to follow our goal to examine intra- and inter-personal associations between personality traits and relationship satisfaction, we applied two types of dyadic cross-lagged models which we established separately for neuroticism and self-esteem. The first type of model refers to an Actor-Partner Interdependence Model (APIM; Kenny et al., 2006) which is the most common model to analyze dyadic data. It included the latent variable neuroticism or self-esteem and latent relationship satisfaction for women and men at both measurement occasions (Figure 6). Based on the model within-person stability coefficients of neuroticism, self-esteem, and relationship satisfaction, the within-person effects across constructs, as well as the between-person effects within the same and across constructs across the intimate partners could be analyzed. As it is of interest in the current study, the model analyzes both actor effects and partner effects of neuroticism/self-esteem on the individual part of relationship satisfaction and vice versa (solid lines in Figure 6). By definition, actor effects represent the individual associations between a predictor and the outcome variable, whereas partner effects represent the dyadic or cross-lagged associations between the predictor and outcome variable (Kenny et al., 2006).

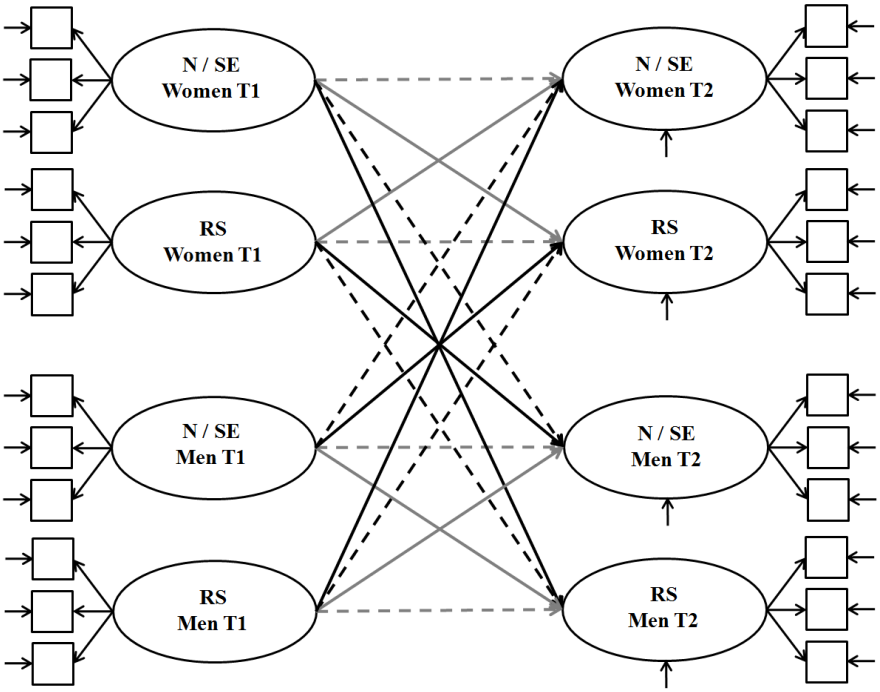

Figure 6. *Longitudinal Actor-Partner Interdependence Model*
Notes. N = neuroticism; SE = self-esteem; RS = relationship satisfaction.

CFM models. The Common Fate Model (CFM; Kenny & La Voie, 1985; Ledermann & Kenny, 2012) is rarely used in the literature of dyadic data analyses. As a major distinction from the classic APIM, the CFM explicitly enables the modeling variables as shared external/contextual factors or common relational variables. Thus, these variables are assumed to be based on both dyad members' perceptions and, subsequently, have an effect on both dyad members (Ledermann & Kenny, 2012). Relationship satisfaction represents a typical common relational variable. Therefore, we implemented the CFM in our second set of analyses in which we applied it in order to model the relationship satisfaction of both intimate partners as relationship climate (Figure 7). Thus, relationship climate is conceptualized as a shared environmental context of the two intimate partners that involves the aspects of relationship satisfaction that is similarly perceived by both members. In contrast to individual relationship satisfaction, latent relationship climate is less biased by interpretation biases with respect to individuals' self-perceptions (Finn et al., 2013). By means of the model depicted in

Figure 7, the within-person stability coefficients and the between-person coefficients of neuroticism/self-esteem can be assessed as well as the stability of the relationship climate (grey hashed lines). In addition, the model enabled us to analyze the effects of both women's and men's neuroticism and self-esteem on relationship climate and vice versa (solid black lines).

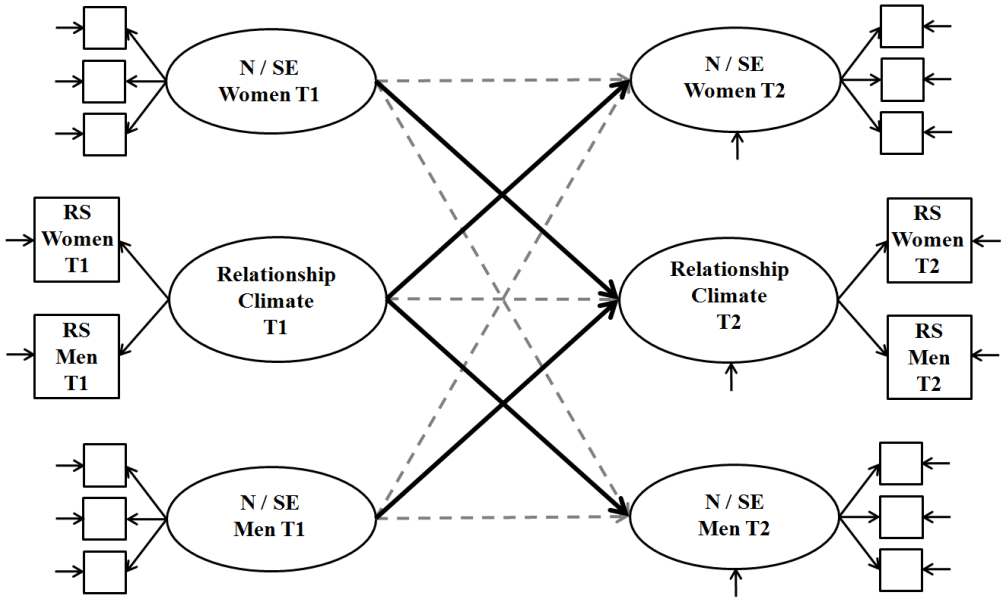

Figure 7. *Extended Common Fate Model*
Notes. N = neuroticism; SE = self-esteem; RS = relationship satisfaction.

As recommended by Kenny et al. (2006, p. 179), we will report the unstandardized regression coefficients in order to assure for comparability of the coefficients across the two dyad members, thus across women and men.

Gender differences in longitudinal associations. For each APIM and extended CFM model, we tested, whether the respective regression coefficients in the two models were equal across intimate partners (i.e., women and men). For that purpose, we conducted model comparisons by means of nested χ^2-difference tests ($\Delta\chi^2$). We successively tested, whether a more constrained model significantly differs in model fit in comparison to a model with

freely estimated regression coefficients (e.g., freely estimated model across gender versus model with constrained stability coefficients for neuroticism). As all model comparisons concerning the main analyses did not differ in model fit, we constrained the effects to be equal for women and men. However, in one case with respect to the additional exploratory analyses, the regression paths were not equal across gender and therefore will be separately reported for women and men (see below).

Control variables. Previous research demonstrated effects of relationship duration on relationship satisfaction (Karney & Bradbury, 1995), as well as age differences and age-related changes in personality traits (e.g., Allemand, Zimprich, & Herzog, 2007; Roberts, Walton, & Viechtbauer, 2006). Thus we tested for effects of possible control variables. Because relationship duration and age were highly correlated (r = .90; p < .001), we only included relationship duration. Because relationship duration did not have any significant effects, we only present the final models without including the control variables.

Analyses were conducted using Mplus version 6.0 (Muthén & Muthén, 2010). Model fit was evaluated using the χ^2-fit test and two additional fit indexes: the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). In general, CFI values above .95 and RMSEA below .06 indicate adequate model fit (Hu & Bentler, 1999). Cohen's *d* was used as a measure of mean differences (Cohen, 1988).

Table 13. *Descriptive Statistics and Correlations among the Study Variables*

		1.	2.	3.	4.	5.	6.
1.	N T1	-	-.51***	-.10	.67***	-.41***	-.22*
2.	SE T1	-.34***	-	.17*	-.53***	.76***	.23**
3.	RS T1	-.17*	.29**	-	-.14	.21*	.83***
4.	N T2	.73***	-.37***	-.20*	-	-.55***	-.27**
5.	SE T2	-.37***	.63***	.30***	-.53***	-	.27**
6.	RS T2	-.14	.24**	.79***	-.19*	.35***	-
	M (SD) Women	2.98 (.72)	3.26 (.50)	4.26 (.65)	2.94 (.71)	3.31 (.45)	4.26 (.64)
	M (SD) Men	2.44 (.64)	3.46 (.41)	4.35 (.53)	2.40 (.66)	3.49 (.39)	4.32 (.56)
	d	0.79	-0.44	-0.15	0.79	-0.43	-0.10

Notes. N = 141 women and 141 men; N = neuroticism; SE = self-esteem; RS = relationship satisfaction; correlations for women above the diagonal, correlations for men below the diagonal; *p < .05, **p < .01, ***p < .001.

4.1.3. Results

Descriptive statistics and zero-order correlations among the study variables are shown in Table 13. At both measurement occasions, we found expected mean-gender differences with respect to neuroticism and self-esteem. Women were more neurotic (T1 and T2: d = 0.79) and had lower self-esteem scores (T1: d = -0.44; T2: d = -0.43) compared to men. No gender differences were found for relationship satisfaction. Although the zero-order correlations between neuroticism, self-esteem, and relationship satisfaction were somehow mixed for women and men, the overall correlations showed a negative association between neuroticism and relationship satisfaction (T1: r = -.14, p < .05; T2: r = -.23, p < .001) and a positive association between self-esteem and relationship satisfaction (T1: r = .23, T2: r = .31, p's < .001).

Effects between Neuroticism, Self-Esteem, and Relationship Satisfaction

The model fits for the final models with respect to the associations between neuroticism, self-esteem, relationship satisfaction, and relationship climate are summarized in Table 14.

Table 14. *Model Fits for the Dyadic Cross-Lagged Models*

Model type		χ^2	*df*	CFI	RMSEA	RMSEA CI 90%
APIM	Neuroticism	241.373	262	1.000	.000	.000; .022
	Self-Esteem	260.766	262	1.000	.000	.000; .033
CFM	Neuroticism	109.559	108	.999	.010	.000; .045
	Self-Esteem	104.467	108	1.000	.000	.000; .040

Notes. N = 141 couples.

Table 15 includes the unstandardized regression coefficients that test the main hypotheses of the study (see Appendix A8 for the complete results). The stabilities for neuroticism, self-esteem, and relationship satisfaction (*b*'s = .68-.76, *p*'s < .001), as well as for relationship climate (*b*'s = .94-.95, *p*'s < .001) were relatively high across the two years. We did not find significant prospective effects of women's neuroticism or self-esteem at T1 on men's neuroticism or self-esteem at T2 and vice versa in neither the classic APIM nor the extended CFA.

Table 15. *Unstandardized Regression Coefficients between Neuroticism, Self-Esteem, Relationship Satisfaction/Relationship Climate at T1 on the Respective Variables at T2*

		Predictor		Outcome		*b*
Neuroticism	APIM	N T1	→	RS T2	AE	-.07*
					PE	.01
		RS T1	→	N T2	AE	-.05
					PE	-.07
	CFM	N T1	→	Climate T2		-.02
		Climate T1	→	N T2		-.12
Self-Esteem	APIM	SE T1	→	RS T2	AE	.06
					PE	.05
		RS T1	→	SE T2	AE	-.03
					PE	.11*
	CFM	SE T1	→	Climate T2		.05
		Climate T1	→	SE T2		.09*

Notes. N = 141 couples; N = neuroticism, RS = relationship satisfaction, SE = self-esteem; Climate = relationship climate; *$p < .05$.

APIM analyses. As hypothesized, we found differential longitudinal associations between neuroticism and relationship satisfaction as compared to self-esteem (Table 15, Figure 6). With respect to neuroticism, results indicated that women's relationship satisfaction at T1 was significantly associated with men's relationship satisfaction at T2 and vice versa. With respect to neuroticism, results revealed a negative prospective effect of neuroticism at T1 on relationship satisfaction at T2 within individuals (i.e., actor effect). That is, women and men with high neuroticism scores at the first measurement occasion reported lower relationship satisfaction two years later. Importantly, this effect occurred controlling for the stability of neuroticism and relationship satisfaction. However, we did not find the expected effects between individuals (i.e., partner effect). We did not find either actor or partner effects between relationship satisfaction at T1 and neuroticism at T2.

With respect to self-esteem, we found the expected opposite pattern. As hypothesized and consistent with the Sociometer theory (Baumeister & Leary, 1995) relationship satisfaction of one partner at T1 was a significant positive predictor of his or her partner's self-esteem at T2 (i.e., partner effect). Thus, individuals with a satisfied partner at T1 had higher self-esteem scores two years later. There were no longitudinal effects of self-esteem on relationship satisfaction.

Extended CFM analyses. The findings of the CFM analyses (Table 15, Figure 7) complemented and accented the reported results of the prior analyses as follows. Interestingly, the negative association between neuroticism and the relationship satisfaction that occurred based on the individual relationship satisfaction scores did not appear with respect to the interplay between neuroticism and relationship climate. That is, high neuroticism of relationship partners at T1 did not have a detrimental effect on the dyadic relationship climate at T2.

In contrast, the extended CFM analyses showed further evidence for the link between relationship satisfaction and self-esteem. More precisely, we found a significant association between relationship climate at T1 and high self-esteem of the intimate partners two years later, that is, the positive relationship climate did predict higher self-esteem of the intimate partners at T2 over and above initial self-esteem. In contrast, women and men's self-esteem was not predictive of relationship climate two years later.

In summary, relationship satisfaction conceptualized as a dyadic climate variable appears to be unrelated to neuroticism but positively related to self-esteem of both partners of the couple.

Exploratory Analyses: Individual- and Relationship-Focused Relationship Satisfaction

The non-significant negative effect of neuroticism on relationship climate raised the question whether neuroticism primarily affects individual as compared to dyadic aspects of relationship satisfaction. Therefore, we conducted additional exploratory analyses based on a posteriori distinction into two domains, respectively potential factors of relationship satisfaction (Table 16). Four items of the Relationship Assessement Scale (RAS; Hendrick, 1988; see Appendix A9) are framed by an *Individual-focus* (e.g., "How well does your partner meet *your needs*?"), whereas three items are framed by a *Relationship-focus* (e.g., "How good *is your relationship* compared to most?"). The two-factor CFA's provided good model fits[6]. Based on the two factors, we ran separate APIM and extended CFM analyses for neuroticism and self-esteem.

[6]Model fits of the two-factor models comprising the *Individual*- and *Relationship*-focused relationship satisfaction as separate factors: T1: $\chi^2 = 32.723$, $df = 13$, $p < .01$, CFI = .983, RMSEA = .073; T2: $\chi^2 = 21.974$, $df = 13$, $p < .01$, CFI = .992, RMSEA = .050. The model fit of the single-factor model was slightly better at T1 ($\Delta\chi^2 = 9.067$, $\Delta df = 1$, $p < .05$), but did not differ in model fit at T2 ($\Delta\chi^2 = 2.735$, $\Delta df = 1$, $p > .05$). Also, the alpha reliabilities of the two factors were good (*Individual-focus:* T1: $\alpha = .89$, T2: $\alpha = .85$; *Relationship-focus:* T1: $\alpha = .86$; T2: $\alpha = .82$).

Table 16. *Unstandardized Regression Coefficients between Neuroticism, Self-Esteem, and (Individual- and Relationship-Focused) Relationship Satisfaction/Relationship Climate at T1 on the Respective Variables at T2*

		Predictor		Outcome		Ind.-Focus *b*	Rel.-Focus *b*
Neuroticism	APIM	N T1	→	RS T2	AE[1]	-.07^{+}	.00 (♂) -.15** (♀)
					PE	.03	-.04
		RS T1	→	N T2	AE	-.01	-.06
					PE	-.08	-.05
	CFM	N T1	→	Climate T2		-.01	-.05
		Climate T1	→	N T2		-.11	-.12^{+}
Self-Esteem	APIM	SE T1	→	RS T2	AE	.08	.10
					PE	.09	.01
		RS T1	→	SE T2	AE	-.02	.02
					PE	.09*	.06^{+}
	CFM	SE T1	→	Climate T2		.07^{+}	.03
		Climate T1	→	SE T2		.07	.10**

Notes. N = 141 couples; [1]gender-differential effects; N = neuroticism, RS = relationship satisfaction, SE = self-esteem; Climate = relationship climate; AE = actor effect; PE = partner effect; Ind.-Focus = Individual-focused relationship satisfaction; Rel.-Focus = Relationship-focused relationship satisfaction; $^{+}p < .10$; $*p < .05$.

Neuroticism. Based on APIM analyses, we found a marginally significant actor effect between neuroticism at T1 and *Individual-focused* relationship satisfaction at T2 suggesting that individuals with higher neuroticism scores at T1 tended to evaluate their relationship at T2 more negatively when taking an *Individual-focus*. In addition, the model based on *Relationship-focused* relationship satisfaction revealed a gender-differential effect suggesting that neurotic women, in contrast to neurotic men, had a more negative view on the relationship from a *Relationship*-perspective two years later.

Regarding the extended CFM analyses we found a marginally negative association between relationship climate at T1 that was modeled using the *Relationship-focused* items

and neuroticism at T2. Thus, those individuals who agreed with their partner at T1 that their relationship was satisfying tended to have lower neuroticism scores two years later.

Self-esteem. The APIM analyses provided evidence for a substantial partner effect between *Individual-focused* relationship satisfaction at T1 and self-esteem at T2 and a marginally significant partner effect with respect to *Relationship-focused* relationship satisfaction. In general, individuals who were in a relationship with a satisfied partner at T1 had a higher self-esteem at T2.

With respect to the CFM analyses, there was a marginally significant association between self-esteem at T1 and *Individual-focused* relationship climate at T2, but no association between climate at T1 and self-esteem at T2. In contrast, the *Relationship-focused* relationship climate at T1 was substantially related to self-esteem at T2. Thus, on the one hand it seems to be that individuals with a high self-esteem at T1 tended to experience a more satisfied relationship climate consisting of fulfilled individual needs and expectations at T2. On the other hand, individuals who agreed with their partner to generally maintain a positive relationship at T1 reported to have higher self-esteem at T2.

4.1.4. Discussion

The current study investigated the bidirectional interplay between neuroticism, self-esteem, and relationship satisfaction, and relationship climate in intimate couples, with relationship satisfaction being conceptualized as one potential outcome of important environmental contexts. Based on a longitudinal dyadic dataset of heterosexual couples from Switzerland, three main finding emerged. First, in line with previous studies (e.g., Dyrenforth et al., 2012; Karney & Bradbury, 1995), we were able to support a negative actor effect of neuroticism on relationship satisfaction. Second, consistent with Sociometer theory (Baumeister & Leary, 1995), our results demonstrated a positive partner effect of relationship satisfaction on self-esteem two years later. Third, relationship climate was not associated

with neuroticism but with self-esteem suggesting that a positive relationship climate at T1 was predictive for higher self-esteem at T2.

Differentiating the results based on the two applied dyadic models, APIM-based models revealed significant longitudinal partner effects of relationship satisfaction. That is, relationship satisfaction of one partner at T1 was significantly related to relationship satisfaction of his or her partner at T2. In contrast, we found non-significant longitudinal partner effects between intimate partner's personality traits. This suggests that the individual's personality development across the two years was unrelated to that of the partner. This is a remarkable finding as many of the couples in the present study are in long-term relationships and a co-development of personality between the intimate partners might be expected (cf. social convoy model, Kahn & Antonucci, 1980). The extended CFM analyses did not provide evidence for a negative association between neuroticism and relationship climate. However, the findings demonstrated a positive association between relationship climate at T1 and self-esteem at T2.

Neuroticism, Self-Esteem, and Relationship Satisfaction

Based on the different origins and functions of neuroticism and self-esteem (Bosson & Swann, 2009; Costa & McCrae, 1992; Leary & Baumeister, 2000; Widiger, 2009), we suggested that neuroticism might be a predictor, whereas self-esteem could constitute an outcome of relationship satisfaction. In the context of the Sociometer theory (Baumeister & Leary, 1995; Leary & Baumeister, 2000), we particularly expected inter-personal associations (i.e., partner effects) between relationship satisfaction and self-esteem, as the partner's satisfaction might fulfill the individual's need for belongingness and inclusion.

In accordance with the VSA model (Karney & Bradbury, 1995), our findings provide evidence for a negative actor effect of neuroticism on relationship satisfaction suggesting that neuroticism affects intra-psychic and intra-personal processes in the relationship context.

However, the absence of the partner effect is contrary to our prediction and previous studies (e.g., Dyrenforth et al., 2010). However, we need to emphasize at least two major advantages of the current study: First, whereas prior research was mostly based on either younger or middle-aged couples, the current sample consisted of couples samples from a wider age-range covering the entire adulthood lifespan. Second, and most importantly, in contrast to many previous studies, the longitudinal design of the current study enabled us to control for the stability of the constructs.

Should we understand neuroticism as a threat of relationship satisfaction? The findings for neuroticism have one negative and one positive implication. On the one hand, it seems that neurotic individuals tend to experience their relationship as less satisfying or perceive it more negatively than emotionally stable individuals (i.e., actor effect). On the other hand, the absence of the partner effect implies that the partner's relationship satisfaction is not longitudinally affected by his or her partner's neuroticism. Thus, neuroticism might be a threat on the individual level, but less harmful for the relationship in general.

Based on Sociometer theory (Baumeister & Leary, 1995; Leary & Baumeister, 2000), self-esteem was expected to represent an outcome of perceived belongingness and would therefore function as an outcome of relationship satisfaction. Positive longitudinal partner effects supported this hypothesis. In the couple context, a satisfied intimate partner appears to show his or her satisfaction in such a way that soothes the spouse's fundamental need of being seen as a valuable, appreciated, and lovable person which, in turn, promotes self-esteem. Importantly, our findings point out that it is the partner's relationship satisfaction that is causing an increase in self-esteem and not one's own relationship satisfaction. This finding suggests that social feedback processes work between the intimate partners. The significant partner effect is also noteworthy with respect to a methodological perspective. Due to different informants, the partner effects in our study are unbiased by shared method variance

(Kenny & Cook, 1999). Therefore, the occurrence of the significant partner effect should be emphasized.

Individual- and Relationship-Focus on Relationship Satisfaction

The additional exploratory analyses based on the *Individual-* and *Relationship-focused* relationship satisfaction generate some additional findings and further questions that might be stimulating for future research. First, despite the fact that the single-factor Relationship Assessment Scale (RAS; Hendrick, 1988) represents an established measure of relationship satisfaction in couple research, our analyses provide first evidence for the idea that the RAS might comprise more than one factor which is reflected in the good model fit of the two-factor solution.

Second, in contrast to the general pattern, there was a marginal negative effect between the *Relationship-focused* relationship climate at T1 and neuroticism at T2 and not vice versa. The *Relationship-focused* climate represents the partner's agreement about the quality of their relationship in general and compared with other relationships. One could speculate that the agreement with respect to the *Relationship-focused* items ("We") does more strongly relate to the conception of relationship climate. Thus, with respect to future research it would be insightful to differentiate between individual and dyadic perspectives on relationship satisfaction and to study whether they differ with respect to effects on personality development such as the development of neuroticism in intimate couples.

Third, we found a gender-differential effect between neuroticism and *Relationship-focused* relationship satisfaction that is of interest. Hence, whereas neuroticism had an actor effect on the *Individual-focused* relationship satisfaction of women and men, the actor effect between neuroticism and *Relationship-focused* relationship satisfaction did only occur in women. One might speculate that neurotic women and men differ in the perspective of their negative relationship interpretation bias (Finn et al., 2013).

Fourth, the results regarding self-esteem provide additional support for the idea that relationship satisfaction and relationship climate are related to the individual's development of self-esteem. The findings of the additional analyses indicated that it is primarily the *Individual-focus* on relationship satisfaction that explains the link between relationship satisfaction and self-esteem. Thus, it might be that individuals who are happy in their relationship because their personal relationship expectations are met by their partner do particularly express their appreciation with respect to their partner. In turn, the partner feels valued, a feeling that is assumed to promote high self-esteem (Leary & Baumeister, 2000). In addition, self-esteem at T2 was predicted by relationship climate based on the *Relationship-focused* relationship satisfaction at T1 which further supports the idea that the "We-perspective" on relationship satisfaction is associated with personality development.

Theoretical and Methodological Implications

The results of our study have several implications. Our findings provided further empirical support for the dynamic interactionism theory (Caspi, 1998; Neyer & Asendorpf, 2001; Neyer et al., 2013) suggesting that personality and aspects of the environment bidirectionally influence each other across time. At the same time, we were able to specify that such bidirectional associations differ by means of the considered personality trait and the specified environmental variable. Our findings confirmed that both neuroticism and self-esteem play an important role for intimate relationships. By means of longitudinal cross-lagged models, we could demonstrate that the two personality traits are differentially linked to relationship satisfaction. Consistent with theoretical assumptions, relationship satisfaction was an outcome of neuroticism, whereas it was a predictor of self-esteem. The first finding supports the assumption that personality traits like neuroticism represent vulnerabilities with respect to relationships but primarily on the individual level as it occurred from our data. The

latter finding emphasized that intimate relationships represent an environment that contribute to the development of favorable personality traits such as self-esteem.

Furthermore, our study emphasizes the theoretical and methodological relevance of the Common Factor Model (Ledermann & Kenny, 2012). The CFM offers an additional perspective to analyze environmental effects in dyadic relationships. As the model extracts the shared portion of a between-dyad variable, it can be used to model an environmental climate or atmosphere that is defined by perceptions of both members of the dyad. However, under the condition that the actor and partner effects are equal across the two dyad members, thus, across women and men as in our study, the main results are expected to be similar across the two model types. Accordingly, our main analyses have shown that relationship satisfaction modeled as common factor provides both consistent and differential results with respect to associations with personality traits in comparison with the analyses on individual relationship satisfaction. For instance, the neuroticism effects on the individual relationship satisfaction within persons disappeared under the condition of the shared relationship satisfaction models. This fact further strengthens the explanations that the neuroticism-relationship satisfaction association is primarily relevant within the individual itself. In addition, the CFM analyses demonstrated a very high stability of the shared relationship satisfaction between T1 and T2 (i.e., two years). This may be due to the composition of our sample of long-term heterosexual couples. To the best of our knowledge, studies including longitudinal modeling of CFM's are still scarce. Thus, we need further studies with diverse samples to better understand the longitudinal development of CFM variables such as relationship climate.

Limitations and Conclusions

Despite its strengths, the current study is subject to several limitations. First, as the interplay between personality traits and relationship satisfaction was studied within two

measurement occasions over two years, it is not possible to draw conclusions about short-term processes that possibly drive such associations between the constructs. As such, short-term longitudinal or experimental data is needed. Second, the current data is limited with respect to conclusions about how change in the respective variables is predictive for level or change in the other variables or whether developmental trajectories of personality traits and relationship satisfaction are related to each other within individuals and between intimate partners. Thus, more measurement occasions about longer time periods would be needed. Third, it is possible that third variables drive the effects between neuroticism, self-esteem, and relationship satisfaction. One might speculate that variables like attachment (cf. Erol & Orth, 2013) or expected appraisals and positive illusions (Murray, Holmes, & Griffin, 1996a; 1996b) are of relevance.

In conclusion, our findings are the first to provide evidence that the dyadic longitudinal interplay between personality traits and relationship satisfaction is different as a function of the considered personality trait. Based on the two types of dyadic longitudinal cross-lagged models that control for the stability of the constructs, we have demonstrated that high neuroticism is a predictor for relationship dissatisfaction within individuals, but not between intimate partners. In contrast, both the individually perceived relationship satisfaction of the intimate partners as well as a positive dyadic relationship climate promotes higher self-esteem across time. Finally, we applied the Common Factor model with respect to relationship satisfaction and implemented it into the context of personality-relationship transactions to study the interplay between relationship climate and personality traits. From our findings, it is implied to study personality-relationship satisfaction transactions within longitudinal dyadic analyses in which the role of individual and shared aspects of as well as the *I*- and *We*-perspective on relationship satisfaction are disentangled.

5. OVERALL DISCUSSION

In the following, the current work is summarized and briefly discussed. While integrating the four studies, the most important implications for future research arising from the current thesis are presented. The last part of the discussion introduces into the "*Tri*ke Model of Personality Development" that aims at explaining stability and change of personality traits while centering on the self-, other-, and meta-perception of personality traits. The thesis closes with a brief conclusion about the current work.

5.1. Summary and Discussion of Current Work

5.1.1. Summary and Discussion of Study 1

Study 1 investigated the development of global and domain-specific aspects (i.e., academic competence, social acceptance, physical attractiveness, behavioral conduct) of self-evaluative personality traits in the transition into early adolescence under the focus on gender, puberty, and school transition. Although the time period of adolescence is widely studied with respect to global self-esteem (e.g., Donnellan, Trzesniewski, & Robins, 2006), the sensitive transition from late childhood to early adolescence is not well understood with respect to the development of global and particularly domain-specific self-representations. Moreover, no study so far has systematically investigated the role of gender, puberty, and school transition on self-development. *Thus, the initial point of Study 1 was the question of how the transition to early adolescence impacts self-development.*

Study 1 provided five main findings. First, with respect to the central question, Study 1 suggests that the transition to early adolescence represents a challenging time for the development of self-evaluative personality traits. Mean-level decreases were found in both global and domain-specific self-representations (i.e., global self-esteem, academic competence, physical attractiveness). Second, the rank-order stabilities of the five domains were generally moderate. Third, gender differences indicated that girls followed steeper

trajectories than boys with respect to the decreasing self-representations. Fourth, developmental aspects of puberty (timing and tempo) did not have an effect on self-development, but concurrent associations were found particularly with respect to adolescents' subjective rating of their pubertal timing. Interestingly, early timing was positively related to girls' but negatively to boys' self-representations. Fifth, the school transition into secondary school was identified as explaining factor for the decreasing trajectories primarily in girls.

Thus, the findings of Study 1 demonstrate that the transition between late childhood and early adolescence represents a critical period for self-development. However, not all domains of self-representations were affected equally strong. For instance, the domain-specific self-concepts of social acceptance and behavioral conduct remained stable with respect to mean-level, suggesting that not all aspects of the self follow the same developmental trajectories. To date, there are no convincing arguments explaining why girls' self-representations are more negatively affected than boys' in early adolescence and specifically in the transition to secondary school. The findings of Study 1 indicate that the subjective perception of pubertal timing based on social comparison processes is more strongly related to self-representations than objective criterions of pubertal development.

One important limitation of Study 1 was that girls and boys were not comparable with respect to the stage of their pubertal development. Girls were already advanced in their development, whereas boys hardly showed first puberty signs at the initial measurement occasion. The latter might explain the low reliability of boys' data in terms of the Pubertal Development Scale (PDS; Petersen, Crockett, Richards, & Boxer, 1988; Watzlawik, 2009), a further shortcoming of Study 1.

It would be insightful to analyze data across a longer developmental period that would enable to compare the effects of different pubertal stages of girls and boys on their self-

development. Furthermore, this would also allow to more precisely disentangle the effects of puberty, gender, and school transition on the development of self-representations.

5.1.2. Summary and Discussion of Studies 2 and 3

Study 2 and Study 3 examined the self-, partner-, and meta-perception of the Big Five traits in the context of relationship satisfaction of intimate couples. To date, the self-perception of personality traits has been the mostly studied personality perception in the field of personality research and also in the context of couple research (e.g., Dyrenforth, Kashy, Donnellan, & Lucas, 2010). However, as individuals' personalities are in permanent interaction with the environment, it is essential to take the social context, such as the context of the intimate relationship, into account when investigating associations between personality traits and relationship satisfaction. *Studies 2 and 3 focused on the question of how self-, partner-, and meta-perceptions of the Big Five traits as well as their discrepancies are related to relationship satisfaction of intimate couples.*

The two studies provided five main findings. First, Study 2 demonstrated that the self-, partner-, and meta-perception of the Big Five traits represent related, albeit distinct aspects of personality exhibiting incremental validity with respect to relationship satisfaction. Second, the APIM analyses showed that low neuroticism scores and high agreeableness and conscientiousness scores were positively associated with relationship satisfaction across all three perspectives, thus across the self-, partner-, and meta-perception. Third, the findings revealed substantial associations between extraversion and relationship satisfaction but only based on the partner- and meta-perception of extraversion. Fourth, Study 3 showed that the self- and partner-perception as well as the partner- and meta-perception did not systematically differ from each other on the discrepancy mean level. However, the latter exhibited substantial variability implying inter-individual differences across couples. Fifth, beyond the latent level factor of personality perceptions, the latent discrepancy factor

demonstrated intra- and inter-individual associations (i.e., actor and partner effects) with relationship satisfaction.

The findings of the Studies 2 and 3 emphasize the importance to use multiple methods (self- and other-report) and perceptions (self-, partner-, and meta-perception) to research personality traits and relationship satisfaction. The results of the two studies suggest that the additional inclusion of the partner- and meta-perception of the Big Five traits provides further insight into the role of personality traits in relationship satisfaction. In addition, Study 3 indicates that the discrepancy between the three perspectives is important to understand the intimate partners' relationship satisfaction.

Study 2 and 3 exhibit similar limitations pointing to the cross-sectional nature of the data that does not allow it to make conclusions about the direction of effects. For instance, it might be that high relationship satisfaction induces positively inflated partner-ratings. In addition, regarding the claim for the use of multiple methods, it could be suggested to use several indicators of relationship satisfaction instead of only one scale based on self-reports.

Both Study 2 and 3 imply that different personality perceptions provide distinct information about the individuals' characterization, and furthermore the discrepancy between the perspectives has a predictive value on an intra- and inter-individual level. Importantly, Study 2 emphasizes that the meta-perception is more than a reflection of the self-perception.

5.1.3. Summary and Discussion of Study 4

Study 4 analyzed the dyadic longitudinal interplay between two personality traits, neuroticism and self-esteem, and relationship satisfaction of intimate couples. Multiple previous studies have looked at cross-sectional as well as longitudinal associations between the Big Five personality traits and relationship satisfaction (e.g., Malouff, Thorsteinsson, Schutte, Bhullar, & Rooke, 2010). In contrast, studies on associations between self-esteem and relationship satisfaction display a minority (e.g, Erol & Orth, 2013). Apart from that, few

studies have investigated whether relationship satisfaction serves as a predictor for personality traits (cf. Neyer, Mund, Zimmermann, & Wrzus, 2013). Moreover, dyadic longitudinal analyses of associations between personality traits and relationship satisfaction that control for the stability of the constructs are scarce. In addition, no study so far has looked at the interplay between personality traits and relationship satisfaction while considering the dyadic nature of relationship satisfaction (i.e., relationship climate) by means of a Common Fate Model (CFM). *Study 4 focused on the question of whether neuroticism and self-esteem are predictors or outcomes of relationship satisfaction and relationship climate.*

The analyses revealed three main findings. First, neuroticism was a predictor of relationship satisfaction on the intra-individual level (i.e., actor effect), but not vice versa. In contrast, self-esteem was an outcome of relationship satisfaction on the inter-individual level (i.e., partner effect), but not vice versa. Third, relationship climate was unrelated to neuroticism, but represented a predictor for self-esteem of both intimate partners.

Study 4 demonstrated that personality traits represent both predictors and outcomes of relationship satisfaction depending on the personality trait in focus. The findings imply that the negative effect of neuroticism on relationship satisfaction primarily exists within but not between individuals. In addition, the results of Study 4 provide evidence for the Sociometer theory (Baumeister & Leary, 1995; Leary & Baumeister, 2000) suggesting that self-esteem is based on the feeling of social inclusion that might be represented in both the partner's relationship satisfaction as well as in a positive relationship climate.

Despite the strength of the longitudinal design of Study 4, the time lag across two years does not allow to make conclusions about short-term processes about the interplay between neuroticism, self-esteem, and relationship satisfaction. In addition, more than two measurement occasions would be needed to study whether change in relationship satisfaction

is predictive of personality level or vice versa. Moreover, it is not possible to examine whether there is correlated change between personality traits and relationship satisfaction.

Study 4 implies that personality traits can serve as both predictors and outcomes of relationship satisfaction. Furthermore, the findings of intra-individual (neuroticism) and inter-individual (self-esteem) associations between personality traits and relationship satisfaction emphasize the importance of considering dyadic data with respect to transactions between personality and relationship satisfaction. Study 4 demonstrated that it is worthwhile to take the dyadic nature of relationship satisfaction into account and to conceptualize it as relationship climate by using the Common Fate Model.

5.2. The Implications of the Current Thesis for Future Research

Based on the four empirical studies of the current thesis, several implications for future research arise. Five of them will be briefly discussed in the following.

Implementation of Multiple Measures and Methods

The results in Study 1 indicated that different approaches to measure pubertal timing lead to a broader picture with respect to the role of puberty for self-representations in early adolescence. In terms of the Big Five personality traits, Studies 2 and 3 clearly demonstrated that the implementation of multiple methods (self- and other-report) and different perspectives on personality traits (self-, partner-, and meta-perception) provided more information about associations between personality and relationship satisfaction. In addition, with reference to Study 4, it has been shown that different ways of capturing relationship satisfaction (individual versus shared relationship satisfaction, *Individual-Focus* versus *Relationship-Focus*) contributes to a more differentiated picture on personality-relationship transactions.

Thus, from the current thesis, it is implied to use a variety of measures and methods in order to increase the understanding with respect to complex psychological phenomena.

Longitudinal data

In the discussion section of all four studies, it was proposed that future research on the respective topic requires either longitudinal instead of cross-sectional data (Studies 2 and 3), longitudinal data across longer time periods (Study 1 and 4), or short-term longitudinal data (Study 4) to study underlying processes. The most ideal way for studying personality development in the context of social relationships would lie in a combination of different designs, thus to link short-term longitudinal data (e.g., diary studies) with long-term longitudinal data (e.g., annual assessments) across multiple occasions to investigate the relationship between micro-processes and long-term changes. In this vein, antecedents, correlates (e.g., correlated change), and consequences of stability and change could be studied. In reference to Studies 2 and 3, it would be insightful to longitudinally investigate whether the self-, partner-, and meta-perception of the personality traits follow the same developmental trajectories or whether they exhibit distinct developmental patterns. The latter case might be related to aspects of the social context such as relationship satisfaction.

Thus, from the current thesis, it is implied to invest in longitudinal research that combines long-term and short-term designs in order to explain the big in the little picture.

Accounting for Third Variables

Studies 2 to 4 of the current thesis focused on broad associations between personality traits and relationship satisfaction. To go a step beyond that, it would be indicated to further investigate the associations by means of explaining factors (i.e., moderators) and underlying mechanisms (i.e., mediators). One important potential moderator that was addressed in the discussion sections of the studies refers to age as well as relationship duration, two variables that are frequently confounded in couple research. In reference to Studies 2 and 3, it might be interesting to investigate whether the overlap between the different personality perspectives increases as a function of age. Thus, one might speculate that the meta-accuracy (overlap

between partner- and meta-perception) of older individuals in longer relationships is higher as they know themselves and their reputations better or because they have spent more time with their partner which might enhance the accuracy of meta-perceptions. Furthermore, with respect to Study 2 and 4, it would be interesting to examine whether the negative link between neuroticism and relationship satisfaction is stronger in older couples, as older individuals are known to strive for harmonious relationships and to avoid strain and conflicts (cf. Charles & Carstensen, 2009).

Attachment could represent an important mediator for the link between neuroticism, self-esteem, and relationship satisfaction. It might be that neurotic individuals have more difficulties to develop a secure attachment to their partner as they tend to see their relationship more negatively or they experience more insecurity than emotionally stable individuals (Finn et al., 2013). In turn, lower relationship satisfaction of the partner could promote insecure attachment that leads to low self-esteem. However, self-esteem itself could be a meaningful mediator that plays an important role for the associations between the meta-perception of personality traits and relationship satisfaction. Thus, it may be that individuals who think that their partners see them as neurotic and less agreeable and conscientious have decreased self-esteem that, in turn, negatively affects relationship satisfaction.

By means of gender, puberty, and the occurrence of school transition, Study 1 already focused on explaining factors. However, from the current study, it is still unclear, why girls experience more negative developmental patterns of self-representations during the transition to early adolescence. Thus, further variables that might account for the gender differences should be considered. A next step could be to investigate physiological markers. Hence, it might be that gender-differential hormonal changes are predictive for differences in self-representation trajectories.

Thus, from the current thesis, it is implied to analyze third variables that potentially explain broad associations as well as inter-individual differences in development that, in turn, might be addressed in the context of psychological interventions.

Social Context: Dyadic Data

In large part, the current thesis centered on the important social context of romantic relationships while focusing on the intimate partner's personality and relationship satisfaction as well as on relationship climate. Subsequently, the current data was of dyadic nature involving advantages on different levels. First, on the basis of the different dyadic perspectives on personality, the association between personality traits could be examined both from inside and outside perspectives as well as by means of intra- and inter-individual associations (Studies 2-4). Second, different sources of report shed light on individual characteristics and their expression in the social environment such as in intimate relationships. By means of explicitly studying discrepancies between inside and outside perspectives on constructs like personality, social interaction outcomes (e.g., relationship satisfaction) can be better understood (Study 3). Dyadic data also have the advantage that they can be used to model parts of the social environment consisting of perceptions of the dyad members. For instance, by means of extracting the shared proportion of relationship satisfaction of the two intimate partners, a form of relationship climate can be established that further can be used as predictor or outcome in the context of other variables such as personality traits (Study 4). Study 1 was not based on dyadic data. However, the findings based on variables that require social comparison processes ("my pubertal development in relation to my peers"). Hence, it is suggested that research regarding the self-development in adolescence needs to consider the social context such as the peers that often represent the most important social relationships in adolescence (e.g., Brown & Larson, 2009).

Thus, from the current thesis, it is implied to account for the social context that is of relevance in the respective developmental period (adolescence: peers; adulthood: intimate relationships) and to collect data that provides insight into that (e.g., peer or dyadic data).

Application of Diverse Methodological and Modeling Approaches

The current thesis was based on individual, dyadic, and longitudinal data. Hence, different methodological approaches as well as adaptations and extensions of existing methods were required. The application of the appropriate method is the key for translating data into knowledge. However, in most of the cases, there are various appropriate methods and analytical procedures that might provide diverse and differential aspects in the acquisition of knowledge.

Thus, from the current thesis, it is implied to strive for the appropriate methods in order to gain knowledge about psychological functions, a process that might comprise the application and comparison of diverse methodological approaches.

5.3. An Integrative View: The *Tri*ke Model of Personality Development

Based on empirical findings and theoretical considerations of the current work, I developed first ideas for a theoretical model on personality development that incorporates the self-, other-, and meta-perception of personality traits. I call the model "*Tri*ke Model of Personality Development".

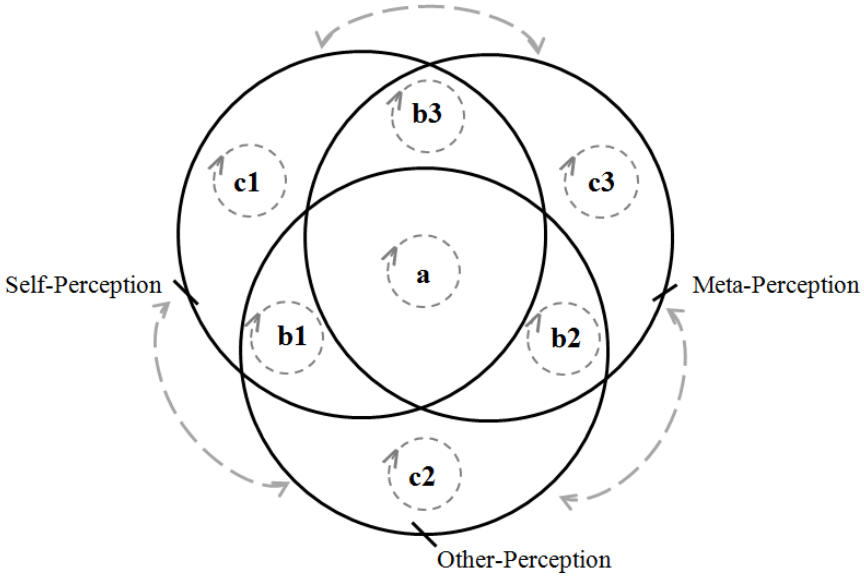

Figure 8. *The Trike Model of Personality Development*
Notes. a = intersection of the self-perception (sp), other-perception (op), and meta-perception (mp); b1 = interception between sp and op; b2; intersection between op and mp; b3 = intersection between sp and mp; c1 = distinct proportion of sp; c2 = distinct proportion of op; c3 = distinct proportion of mp.

The Three Wheels of the Trike

The *Tri*ke Model of Personality Development visualized in Figure 8 consists of the self-, other-, and meta-perception of personality conceptualized as three moving, intersecting wheels. The wheels of the *Tri*ke are in permanent motion driven by processes that proceed either within or between the wheels.

The self-perception wheel includes self-reported individuals' representations about the own personality. Processes that might keep moving this wheel refer to self-reflection, personal memory recall, or social comparisons (cf. Hart & Matsuba, 2012). The other-perception wheel involves reputations or, in other words, observations from social interaction partners based on other-reports. Processes that propel this wheel are related to incorporated reflections about social interactions and observations, internalized information of other people (e.g., gossiping), or activation of stereotypes (Hofstee, 1994). The meta-perception

wheel reflects representations individuals have about their reputation. Processes that turn this wheel are social feedbacks and mind-reading (Carlson & Kenny, 2012).

An Ontogenetic Perspective on the Trike

From an ontogenetic perspective (see Figure 9), it is assumed that the *Tri*ke develops in stages. I suggest that in the earliest childhood the model consists of just one wheel, namely the other-perception as infants have not yet acquired a conscious awareness of their self and are not able to abstract their self as distinct unity (Harter, 2012; Rochat, 2003). In the second stage in early childhood, the self-perception wheel might evolve as a result of gained cognitive skills which enable children to develop self-consciousness (Kagan, 1984; Lewis, 1992; Lewis, Sullivan, Stanger, & Weiss, 1989; Rochat, 2003). The latter process is a perquisite for the development of the third wheel, the meta-perception. The development of the meta-perception goes along with a shift from the I-perspective to the I- and Me-perspective on the self that is driven by acquired complex cognitive skills in middle childhood such as the ability of perspective-taking (cf. James, 1890; Harter, 2006a; Harter, 2006b; Harter, 2012; Rochat, 2003). Focusing on the other end of the life span, it might be that in old age the *Tri*ke degenerates to the stages of two wheels (self- and other-perception) and one wheel (other-perception) due to loss of self-awareness caused by cognitive impairment based on dementia (e.g., Rankin, Baldwin, Pace-Savitsky, Kramer, & Miller, 2005).

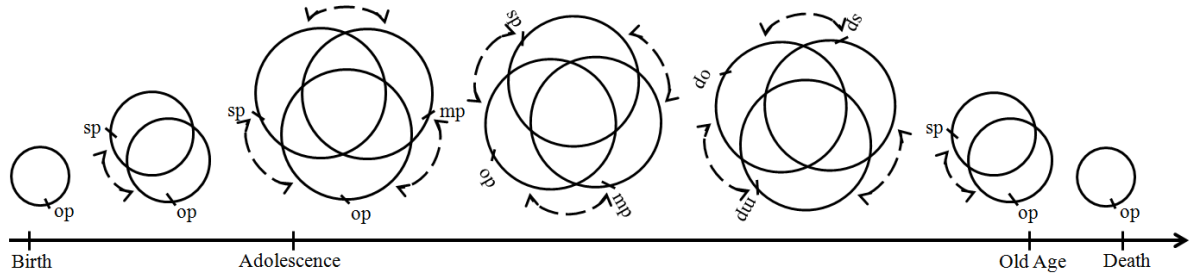

Figure 9. *A Life Span Perspective on the Trike Model*
Notes. sp = self-perception; op = other-perception; mp = meta-perception.

Intersecting and Distinct Parts of the Trike

It is assumed that the three wheels of the *Tri*ke substantially intersect, but also contain information about an individual's personality that is not shared by the other two wheels. In the following, the composition of the *Tri*ke is explained more precisely by focusing on the different parts labeled in Figure 8.

Part a: The core of the *Tri*ke describes personality aspects that are represented in all three wheels, that is, those captured by the self-, other-, and meta-perception. What kind of personality aspects could that be? The part *a* of the model might involve personality traits that are particularly well observable from an outside perspective (other-perception). These personality aspects might evoke feedback processes between observers (i.e., other-perception) and the individual (self-perception) mediated by the meta-perception. Thus, it might be that those personality traits are socially rather desirable as other might be less likely to initiate feedback processes. Moreover, the personality traits in part *a* of the *Tri*ke might refer to basic personality traits that describe typical behaviors consistent across time and contexts (e.g., inhibition versus approach).

Parts b1-b3: The parts *b1 to b3* describe personality aspects that are only shared by two of the perceptions. First, *b1* describes the overlap between the self- and other-perception. The absence of the meta-perception of the personality traits in *b1* implies that the individual is not

aware of or is blind with respect to his or her reputation of these personality traits. For instance, *b1* might involve personality aspects that individuals unsuccessfully try to hide in the social environment, such as parsimony and jealousy.

Second, *b2* refers to the overlap between the other- and meta-perception. *b2* could include personality traits that individuals do not evaluate as being characteristic for them (absence of self-perception), but that are known as being wrongly represented in others' reputation of them. Examples for such personality aspects could refer to stereotypes. Third, *b3* corresponds to the overlap between the self- and meta-perception. In contrast to *b1*, *b3* might contain personality traits that are thought to be perceived by others, but are actually not incorporated in the other-perception due to their low observability (e.g., anxious or creative) or their risk of being misinterpreted (e.g., arrogant instead of shy).

Parts c1-c3: The parts *c1-c3* refer to the proportions of the three wheels that are not intersecting with the other wheels. *c1* refers to the distinct part of the self-perception that might include those personality aspects that are unwanted and therefore inhibited in social interactions (e.g., xenophobia, pathological tendencies). *c2* refers to the distinct part of the other-perception which might involve misjudgments of strangers or unaffable or wrong attributions of others who dislike the individual. In turn, *c2* might comprise overly positive illusions that are fully unrelated to the person (e.g., blind love). *c3* refers to the distinct part of the meta-perception which represents biased meta-perceptions of insecure individuals who are not able to accurately evaluate their reputation or who exhibit personality disorders (e.g., borderline patients).

A Developmental Perspective on the Three Wheels

The *Tri*ke Model proposes that interaction processes between the three wheels explain mechanisms of personality stability or change.

Processes of Stability

It is assumed that the core of the *Tri*ke (*a* in Figure 8) represents those personality patterns that tend to be particularly stable across time driven by processes between the three wheels that reinforce the respective characteristics. Different loops of reinforcement might be at work. For instance, it might be that individuals behave as they see themselves (self-perception [1]: "I'm a social and outgoing person, I like to go to parties") which, in turn, affects the other-perception [2] ("Oh yes, he's very extraverted, he's so into parties") that feeds back into the meta-perception [3] ("My friends probably think that I'm extraverted, because I'm the party animal in our group). Alternatively, the other-perception [1] is expressed in social interactions such as conflicts ("You are always so sensitive") that, in turn, influence the meta-perception [2] ("He thinks, I'm sensitive"), that affects the self-perception [3] ("I'm pretty sensitive"). With reference to the idea that the self-perception of personality might comprise the individual's identity (Hogan & Roberts, 2004; Roberts & Wood, 2006), the overlap between the self-, other-, and meta-perception could be considered as the *social identity*.

Processes of Change

Potential Change in Part a: Although the personality traits in the part *a* of the model may represent the most stable aspects, they might also be prone to change. The latter might have been happened when the interaction loops between the wheels stop providing the same information. For instance, - let us go back to Simon who we met in Studies 2 and 3, it might be that in adolescence Simon used to have the reputation (other-perception) of being lazy, chaotic, and irresponsible (i.e., low in conscientiousness). Back then, Simon was aware of his reputation (meta-perception), and he also saw himself as not really conscientious (self-perception). However, when Simon started his first job as an engineer, he was forced to exact work, to be punctual, and reliable. As a consequence, Simon's boss was very satisfied with

him and his precision as well as with Simon's willingness to take on responsibility in the company. Thus, the positive feedback from his boss affected Simon's meta-perception of being not as low in conscientiousness anymore as he used to think. This, in turn, gradually altered Simon's self-perception about his conscientiousness level. Hence, changes in individuals' self-perception levels of personality traits might be a result of altered information from the environment (i.e., other-perception) that, in turn, evoke changes in the self-reflection (i.e., meta-perception: "How do others see me and how am I?"; self-perception: "How am I then really?").

Potential Change in Parts b1-b3: Potential change with respect to personality traits might also be explained by parts of the personality that are only incorporated in two of the three perspectives. The following example refers to part *b1* of the model, thus, the intersection between the self- and other-perception, or more precisely the intersection between the self- and *partner*-perception. To illustrate that with another example, we now focus on Laura, who we know as Simon's girlfriend from Studies 2 and 3. Before Laura met Simon, she used to think that she is a very introverted person who does not like to "kick over the traces". However, that changed when she fell in love with Simon and went to all these crazy parties with him, where she enjoyed herself so much and discovered a new side of her being outgoing and energetic (i.e., extraverted) which reflects in the overlap between the self- and the other-perception of Simon (i.e., partner-perception). It might be that the overlap between the self- and other-perception of Laura's extraversion is primarily only evidenced in the specific overlap between the self-perception of Laura and the partner-perception of Simon in the specific context of their relationship. However, it might be that this is the start of a personality development process in terms of Laura becoming more extraverted that will reflect in the other-perceptions of other individuals than Simon and finally in Laura's general self- and meta-perception. Thus, based on the processes proposed by the *Tri*ke model, it

might be explained why Laura's entering in her relationship with Simon resulted in an increase of Laura's extraversion.

Potential Change in Part c1-c3: What kind of processes could be at work to explain change of personality aspects in the outer parts of the models that distinctly belong to one of the three perceptions? By means of an example in reference to part *c1*, one could assume that a person - let's call her Sylvie - knows about her undesirable tendency to be mistrustful (self-perception). For instance, she avoids sharing personal information with other people, she thinks that other people do not mean well with her or she has difficulties to commit to intimate relationships. For a long time, nobody except from Sylvie thinks that she has a problem in this regard because Sylvie tries to mask that unwanted tendency. Thus, Sylvie's tendency to be mistrustful was only incorporated in her self-perception. But, the older Sylvie gets, the tendency intensifies and more and more expresses in behavior that is observable for others. Thus, by and by people start to think that Sylvie is a bit oddly and they more and more avoid contact with her and ignore her. The latter feeds back into Sylvie's meta-perception as well as her self-perception and she realizes that her mistrust increased over the years. Thus, social feedbacks of others with respect to a personality aspect that used to be unseen by others might function as indicator why a personality aspect increased across time reflecting in higher self-perception scores on that personality aspect.

In conclusion, the *Tri*ke model generally proposes that changes in personality traits are reflected in altered processes within and between the three wheels of the *Tri*ke. Furthermore, it suggests that social interactions and experiences with social interaction partners mirror personality development and are an important key in understanding stability and change with respect to individuals' self-perceptions of their personalities.

Inter-individual Perspective on the Trike Model

In going a step beyond, I assume that the intersection level between the three wheels of the *Tri*ke on the one hand systematically varies as a function of age, and on the other hand shows inter-individual differences within every developmental stage across the life span. With respect to the first assumption regarding age differences, I expect that the intersection between the self-, other-, and, meta-perceptions on the mean-level increases with age. Thus, over the years of life, individuals experience and reflect themselves across a wide array of situations and contexts in which they received feedbacks from others about their personality leading to gained knowledge about how their person is perceived by the environment. With respect to overlaps between self, other-, and meta-perceptions in the context of close interactions partner (family, friends, intimate partner), I assume that the increasing intersection is related to a decreasing social network of older individuals (cf. Charles & Carstensen, 2009). The latter might go along with increased relationship quality that enhances the processes between the *Tri*ke wheels as individuals share more information about their person with fewer, close people.

With respect to the second assumption regarding inter-individual differences, I suggest that individuals differ from each other with respect to how much of their self-perceived personality traits (i.e. identity) is perceived from an outside-perspective (self-other-agreement), or how much individuals see their identity verified by perceptions of others (self-meta-agreement), or how accurate individuals are with respect to their reputation in the social environment (meta-accuracy). First evidence for this idea was provided by Study 3 of the current thesis in the context of intimate partners. One might speculate that the different patterns with respect to the three forms of overlap between the perspectives are meaningfully related to psychological processes and mental health. For example, a high overlap between

the three perceptions might soothe the individuals' need for coherence (cf. self-verification; Swann, 1983).

Thus, the ideas arising from the *Tri*ke model might be stimulating for future research. For example, it might be insightful to study age differences in intersection patterns of the self-, other-, and meta-perceptions. Furthermore, longitudinal analyses would shed light on the question whether the wheels of the *Tri*ke become more intersecting across time. With respect to intimate couples, it might be interesting to study whether changes in the perception intersections (e.g., increases in partner-verification versus partner-enhancement; Rusbult, Finkel, & Kumashiro, 2009) are predictive for relationship satisfaction or relationship stability. In addition, different groups of individuals could be investigated in terms of differences in *Tri*ke compositions. For example, it might be of interest to examine whether individuals with low self-esteem, high depression, or beginning dementia differ from individuals with high self-esteem, low depression, or no cognitive impairment.

5.4. Final Conclusions of the Current Thesis

Three general conclusions from findings of the current thesis arise that have implications for future research on the co-developmental interplay between personality traits and the environmental context of intimate relationships. First, personality traits comprise *inside* and *outside* aspects that have shared, but also unique proportions in terms of the description of individuals' personalities. Thus, it is implied to use multiple perceptions of personality traits such as self-, other-, and meta-perceptions that account for the transactional nature of the relationship between personality and the environment consisting of social interaction partners. Second, both personality traits and relationship satisfaction have *dyadic* units. In reference to the second, findings from the current thesis emphasize that shared aspects of relationship satisfaction conceptualized as relationship climate has associations with personality that are distinct from associations with individual aspects of relationship

satisfaction. Hence, future research on personality-relationship transactions should apply methods that consider the dyadic quality of relationship satisfaction (e.g., by means of Common Fate Models). Third, personality traits have stable and changeable proportions that might be accentuated in meaningful transitional developmental phases. Furthermore, related personality aspects such as self-evaluative traits do not necessarily exhibit equal developmental trajectories. Thus, future research on personality should consider its *developmental* nature and individuals' stages with respect to formative developmental phases such as important biological or social transitions. In addition, future research might focus on underlying developmental mechanisms that explain why some aspects of personality simultaneously change (i.e., correlated change), whereas others remain stable.

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ZUSAMMENFASSUNG

Die vorliegende Doktorarbeit beschäftigt sich mit individuellen und dyadischen Aspekten der Persönlichkeitsentwicklung. Letzeres wird im Kontext von intimen Partnerschaften studiert. Des Weiteren untersucht die Arbeit „innere“ und „äussere“ Perspektiven auf Persönlichkeitseigenschaften (Selbst-, Fremd- und Meta-Wahrnehmung) und deren Rolle für die Beziehungszufriedenheit von Paaren.

Der erste Teil der Arbeit führt theoretisch in Persönlichkeitseigenschaften ein, fasst zusammen, was man über die Lebensspannen-Entwicklung von Persönlichkeitseigenschaften weiss und diskutiert den Einfluss der Umwelt, insbesondere in Form von sozialen Beziehungen, auf die Persönlichkeitsentwicklung. Unter einem methodischen Blickwinkel werden verschiedene Typen von Strukturgleichungsmodellen vorgestellt, deren Anwendung sich für die Analyse von längsschnittlichen und oder dyadischen Daten anbietet. Das Einleitungskapitel schliesst mit einem Überblick über die empirischen Arbeiten, die dieser Doktorarbeit zugrunde liegen, ab.

Der Hauptteil der Arbeit besteht aus vier empirischen Studien. Studie 1 beschäftigt sich mit der individuellen Entwicklung des globalen Selbstwerts und domänenspezifischer Selbstkonzepte in der Transition zur frühen Adoleszenz. Dabei werden Einflüsse des Geschlechts, der pubertären Entwicklung und des Schulübertritts analysiert. Studien 2 und 3 konzentrieren sich auf das dyadische Zusammenspiel zwischen der Selbst-, Partner- und Meta-Wahrnehmung auf die Big Five Persönlichkeitseigenschaften und der Beziehungszufriedenheit von Paaren. Dabei fokussiert Studie 2 auf die Ähnlichkeit und Unterschiedlichkeit der drei Wahrnehmungsperspektiven und deren Zusammenhänge mit Beziehungszufriedenheit. Im Gegensatz dazu untersucht Studie 3, inwiefern Abweichungen zwischen den Wahrnehmungen mit Beziehungszufriedenheit assoziiert sind. Studie 4 geht der der Transaktion zwischen den Persönlichkeitseigenschaften Neurotizismus und Selbstwert

und individuellen und dyadischen Aspekten (Beziehungsklima) von Beziehungszufriedenheit nach. Dabei wird längsschnittlich untersucht, ob sich Persönlichkeitseigenschaften auf die Beziehungszufriedenheit auswirken oder umgekehrt und ob die Zusammenhänge intra- oder inter-personaler Natur sind.

Im Diskussionsteil der Arbeit werden die Hauptbefunde der vier Studien zusammengefasst und die Implikationen der Studien werden aus einer integrativen Perspektive diskutiert. Der Abschluss der Arbeit besteht aus einer Darstellung des entwickelten theoretischen Modells „*Tri*ke Model of Personality Development“, welches auf den empirischen Befunden der vorliegenden Dissertation und weiterführenden theoretischen Überlegungen basiert.

A1. *CFA Analyses: Neuroticism*

Model	1-2-, or 3-Factor Model (FM)	χ^2	*df*	CFI	RMSEA	Model comparison	$\Delta\chi^2$	Δdf
M1	1-FM: sp-pp-mp	167.752***	14	.904	.160	-	-	-
M2	2-FM: sp-pp vs. mp	152.383***	13	.913	.158	M2 vs. M1	15.369***	1
M3	2-FM: sp-mp vs. pp	66.967***	13	.966	.098	M3 vs. M1	100.785***	1
M4	2-FM: pp-mp vs. sp	121.463***	13	.932	.139	M4 vs. M1	46.289***	1
M5	3-FM: sp vs. pp vs. mp	36.443***	11	.984	.073	M5 vs. M1	131.309***	3
						M5 vs. M2	115.94***	2
						M5 vs. M3	30.524***	2
						M5 vs. M4	85.020***	2
M6	1-FM: sp-pp	120.653***	5	.884	.232	-	-	-
M7	2-FM: sp vs. pp	6.501	4	.997	.038	M7 vs. M6	114.152***	1
M8	1-FM: sp-mp	46.597***	5	.965	.139	-	-	-
M9	2-FM: sp vs. mp	22.762***	4	.984	.104	M9 vs. M8	23.835***	1
M10	1-FM: pp-mp	75.862***	2	.880	.293	-	-	-
M11	2-FM: pp vs. mp	8.662**	1	.988	.133	M11 vs. M10	67.200***	1

Notes. sp = self-perception; pp = partner-perception; mp = meta-perception; **$p < .01$; ***$p < .001$.

A2. *CFA Analyses: Extraversion*

Model	1-2-, or 3-Factor Model (FM)	χ^2	*df*	CFI	RMSEA	Model comparison	$\Delta\chi^2$	Δdf
M1	1-FM: sp-pp-mp	173.079***	14	.910	.162	-	-	-
M2	2-FM: sp-pp vs. mp	147.429***	13	.924	.155	M2 vs. M1	25.650***	1
M3	2-FM: sp-mp vs. pp	67.997***	13	.969	.099	M3 vs. M1	105.082***	1
M4	2-FM: pp-mp vs. sp	155.796***	13	.899	.160	M4 vs. M1	17.283***	1
M5	3-FM: sp vs. pp vs. mp	35.530***	11	.986	.072	M5 vs. M1	137.549***	3
						M5 vs. M2	111.899***	2
						M5 vs. M3	32.467***	2
						M5 vs. M4	120.266***	2
M6	1-FM: sp-pp	119.003***	5	.889	.230	-	-	-
M7	2-FM: sp vs. pp	6.710	4	.997	.040	M7 vs. M6	112.293***	1
M8	1-FM: sp-mp	44.518***	5	.969	.135	-	-	-
M9	2-FM: sp vs. mp	13.131*	4	.993	.073	M9 vs. M8	31.387***	1
M10	1-FM: pp-mp	117.324***	2	.854	.366	-	-	-
M11	2-FM: pp vs. mp	18.690***	1	.978	.203	M11 vs. M10	98.634***	1

Notes. sp = self-perception; pp = partner-perception; mp = meta-perception; *p < .05; **p < .01; ***p < .001.

A3. *CFA Analyses: Openness*

Model	1-2-, or 3-Factor Model (FM)	χ^2	*df*	CFI	RMSEA	Model comparison	$\Delta\chi^2$	Δdf
M1	1-FM: sp-pp-mp	198.355***	14	.872	.175	-	-	-
M2	2-FM: sp-pp vs. mp	182.377***	13	.883	.174	M2 vs. M1	15.978***	1
M3	2-FM: sp-mp vs. pp	57.512***	13	.969	.089	M3 vs. M1	140.843***	1
M4	2-FM: pp-mp vs. sp	149.866***	13	.905	.156	M4 vs. M1	48.489***	1
M5	3-FM: sp vs. pp vs. mp	21.345*	11	.993	.047	M5 vs. M1	177.010***	3
						M5 vs. M2	161.032***	2
						M5 vs. M3	36.167***	2
						M5 vs. M4	128.521***	2
M6	1-FM: sp-pp	160.592***	5	.809	.269	-	-	-
M7	2-FM: sp vs. pp	3.060	4	1.000	.000	M7 vs. M6	157.532***	1
M8	1-FM: sp-mp	30.074***	5	.976	.108	-	-	-
M9	2-FM: sp vs. mp	2.983	4	1.000	.000	M9 vs. M8	27.091***	1
M10	1-FM: pp-mp	126.458***	2	.809	.380	-	-	-
M11	2-FM: pp vs. mp	9.614**	1	.987	.141	M11 vs. M10	116.844***	1

Notes. sp = self-perception; pp = partner-perception; mp = meta-perception; *p < .05; **p < .01; ***p < .001.

A4. *CFA Analyses: Agreeableness*

Model	1-2-, or 3-Factor Model (FM)	χ^2	*df*	CFI	RMSEA	Model comparison	$\Delta\chi^2$	Δdf
M1	1-FM: sp-pp-mp	182.011***	14	.843	.167	-	-	-
M2	2-FM: sp-pp vs. mp	170.089***	13	.853	.167	M2 vs. M1	11.922***	1
M3	2-FM: sp-mp vs. pp	76.742***	13	.940	.107	M3 vs. M1	105.269***	1
M4	2-FM: pp-mp vs. sp	168.303***	13	.854	.166	M4 vs. M1	13.708***	1
M5	3-FM: sp vs. pp vs. mp	64.125***	11	.950	.106	M5 vs. M1	117.886***	3
						M5 vs. M2	105.964***	2
						M5 vs. M3	12.617**	2
						M5 vs. M4	104.178***	2
M6	1-FM: sp-pp	106.579***	5	.819	.217	-	-	-
M7	2-FM: sp vs. pp	7.258	4	.994	.043	M7 vs. M6	99.321***	1
M8	1-FM: sp-mp	67.035***	5	.917	.170	-	-	-
M9	2-FM: sp vs. mp	53.802***	4	.934	.170	M9 vs. M8	13.233***	1
M10	1-FM: pp-mp	91.431***	2	.811	.322	-	-	-
M11	2-FM: pp vs. mp	2.250	1	.997	.054	M11 vs. M10	89.181***	1

Notes. sp = self-perception; pp = partner-perception; mp = meta-perception; **$p < .01$; ***$p < .001$.

A5. *CFA Analyses: Conscientiousness*

Model	1-2-, or 3-Factor Model (FM)	χ^2	*df*	CFI	RMSEA	Model comparison	$\Delta\chi^2$	Δdf
M1	1-FM: sp-pp-mp	261.264***	14	.812	.202	-	-	-
M2	2-FM: sp-pp vs. mp	249.043***	13	.820	.205	M2 vs. M1	12.221***	1
M3	2-FM: sp-mp vs. pp	136.827***	13	.906	.149	M3 vs. M1	124.737***	1
M4	2-FM: pp-mp vs. sp	215.314***	13	.846	.190	M4 vs. M1	45.950***	1
M5	3-FM: sp vs. pp vs. mp	95.882***	11	.935	.134	M5 vs. M1	165.382***	3
						M5 vs. M2	153.161***	2
						M5 vs. M3	40.945***	2
						M5 vs. M4	119.432***	2
M6	1-FM: sp-pp	176.862***	5	.750	.282	-	-	-
M7	2-FM: sp vs. pp	27.705***	4	.966	.117	M7 vs. M6	149.157***	1
M8	1-FM: sp-mp	100.423***	5	.895	.210	-	-	-
M9	2-FM: sp vs. mp	72.482***	4	.925	.199	M9 vs. M8	27.941***	1
M10	1-FM: pp-mp	106.523***	2	.828	.348	-	-	-
M11	2-FM: pp vs. mp	14.179***	1	.978	.175	M11 vs. M10	92.344***	1

Notes. sp = self-perception; pp = partner-perception; mp = meta-perception; ***$p < .001$.

A6. *Model Fits for the APIM Analyses*

Big Five Trait	Perception	χ^2	*df*	CFI	RMSEA	90% CI (RMSEA)
Neuroticism	Self-perception	78.142*	56	.987	.043	.015; .064
	Partner-perception	78.083***	35	.969	.076	.053 .098
	Meta-perception	67.570**	35	.975	.066	.042; .089
Extraversion	Self-perception	91.567**	56	.979	.054	.033; .074
	Partner-perception	51.322*	35	.988	.047	.012; .072
	Meta-perception	59.783**	35	.982	.057	.031; .082
Openness	Self-perception	74.502	56	.988	.039	.001; .061
	Partner-perception[1]	58.456*	36	.984	.054	.026; .078
	Meta-perception	48.573	35	.990	.042	.000; .069
Agreeableness	Self-perception	122.444***	56	.954	.074	.056; .092
	Partner-perception	63.026**	35	.980	.061	.036; .085
	Meta-perception	53.208*	35	.986	.049	.018; .075
Conscientiousness	Self-perception	78.870*	56	.985	.044	.017; .065
	Partner-perception	77.667***	35	.970	.075	.053; .098
	Meta-perception[1]	87.912***	.36	.962	.082	.060; .104

Notes. N = 216 couples; *p < .05; **p < .01; ***p < .001; [1]due to negative variances, the two second parcel loadings were fixed to 1 for men.

A7. *Measurement Invariance Analyses*

		χ^2	*df*	$\Delta\chi^2$	Δdf	CFI	RMSEA	RMSEA 90% CI
Neuroticism	Unconstrained model	3.935	5	-	-	1.000	.000	.000; .073
	Weak invariance model	4.402	8	3	0.467	1.000	.000	.000; .043
	Strong invariance model	8.199	11	3	3.797	1.000	.000	.000; .049
	Strict invariance model	13.857	14	3	5.658	1.000	.010	.000; .057
	Strict invariance model gender[1]	37.752	35	21	23.895	.997	.024	.000; .067
Self-Esteem	Unconstrained model	1.879	5	-	-	1.000	.000	.000; .043
	Weak invariance model	7.633	8	3	5.754	1.000	.000	.000; .068
	Strong invariance model	12.173	11	3	4.540	.999	.019	.000; .067
	Strict invariance model	15.436	14	3	3.263	.999	.019	.000; .062
	Strict invariance model gender[1]	41.103	35	21	25.667	.993	.035	.000; .073
Relationship Satisfaction	Unconstrained model	3.021	5	-	-	1.000	.000	.000; .063
	Weak invariance model	4.739	8	3	1.718	1.000	.000	.000; .046
	Strong invariance model	7.231	11	3	2.492	1.000	.000	.000; .042
	Strict invariance model	12.875	14	3	5.644	1.000	.000	.000; .054
	Strict invariance model gender[1]	25.844	35	21	12.969	1.000	.000	.000; .032

Notes. $N = 282$; [1]$N = 141$.

A8. *Complete Results: Main Analyses*

			Predictor		Outcome	*b*
Neuroticism	APIM	Stabilities	N T1	→	N T2	.76***
			RS T1	→	RS T2	.75***
		Between-person effect	N T1	→	N T2	-.04
		(same construct)	RS T1	→	RS T2	.15**
		Actor effects	N T1	→	RS T2	-.07*
			RS T1	→	N T2	-.05
		Partner effects	N T1	→	RS T2	.01
			RS T1	→	N T2	-.07
	CFM	Stabilities	N T1	→	N T2	.76***
			Climate T1	→	Climate T2	.95***
		Between-person effect	N T1	→	N T2	-.04
		Personality on climate	N T1	→	Climate T2	-.02
		Climate on personality	Climate T1	→	N T2	-.12
Self-esteem	APIM	Stabilities	SE T1	→	SE T2	.69***
			RS T1	→	RS T2	.75***
		Between-person effect	SE T1	→	SE T2	.05
		(same construct)	RS T1	→	RS T2	.14**
		Actor effects	SE T1	→	RS T2	.06
			RS T1	→	SE T2	-.03
		Partner effects	SE T1	→	RS T2	.05
			RS T1	→	SE T2	.11*
	CFM	Stabilities	SE T1	→	SE T2	.68***
			Climate T1	→	Climate T2	.94***
		Between-person effect	SE T1	→	SE T2	.06
		Personality on climate	SE T1	→	Climate T2	.05
		Climate on personality	Climate T1	→	SE T2	.09*

Notes. N = 141 couples; N = neuroticism; SE = self-esteem; RS = relationship satisfaction; *p < .05; **p < .01; ***p < .001.

A9. *"Individual-Focus" and "Relationship-Focus" (RAS-Items)*

	Item	Item content
Individual-Focus	1	How well does your partner meet *your needs*?
	4	How often to you wish *you hadn't gotten* into this relationship?
	5	To what extent has your relationship met *your original expectations*?
	6	How much do *you love* your partner?
Relationship-Focus	2	In general, how satisfied are you *with your relationship*?
	3	How good is *your relationship* compared to most?
	7	How many problems are there in *your relationship*?

Notes. Words in italics highlight the Individual- and Relationship-Focus.

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